CROSS WORDS

The Gesneriad Hybridizers Association

NEWSLETTER

Volume VI, Issue 3, 1982

Editors' Message:

We were greatly saddened to learn of the death, in September, of Art Belanger. Art was an avid hybridizer who had the foresight to realize the need for a hybridizers association and whose interest led to the formation of this newsletter forum, "CrossWords," and the Gesneriad Hybridizers Association. Art and his wife Peg were the co-editors and together they put out excellent editions, answered questions, typed labels and spread their enthusiasm about hybridizing gesneriads. We shall miss him.

We extend our deepest sympathy to Peg and their family.

— *Anne Crowley and Al Wojcik*

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Questions About African Violets

Dennis Lee Burman
Everett, Washington

As the vast majority of my gesneriads are African violets, I echo the suggestion in "CrossWords," Vol. VI, Issue 2 that Peter Hesse write an article on African violet hybridizing. And, I have some questions:

1. If one hybridizes an African violet that looks promising, how can one know whether or not it just might be a duplicate of one of thousands already on the market?

You can't. "African Violet" magazine, published by AVSA, Inc., P.O. Box 1326, Knoxville, Tenn. 37901 (Individual Membership: $9.00 per year) lists all varieties registered, all recognized species, and non-registered cultivars introduced from 1966 to June 1, 1976 in their Master Variety List. Supplements are published each September. Each issue has photographs of new introductions and would be helpful to any African violet grower or hybridizer.

2. If a hybrid is worthy of being kept and even marketed, how does one know which names have already been chosen for other African violets?

See the above answer. If you have a promising hybrid, grow it on for three generations to test its stability. If it still shows potential, your next step might be to register your hybrid. AVSA, Inc. is the officially designated society for the registration of names of Saintpaulia. The Plant Registration Chairman for AVSA is Janet L. Nichols, 9 Clover Hill Rd., Poughkeepsie, N.Y. 12603. The Registrar will advise you if the proposed name is available — that is, not already in valid use.

3. Sometimes my African violet seedlings remain small, existing but barely growing, for an excessive period of time. One source says that one can have flowering plants 6-8 months from seed. My seedlings have taken much longer. Could this have something to do with the acidity of the soil?

Seedlings vary greatly and are influenced by light, temperature, fertilizer, season, soil pH, etc. Optimum pH for Saintpaulias is within a range of 6.4 to 7.4. Have your soil tested or test it yourself with a Sudbury soil test kit. Keep in mind that most gesneriad seeds have a very limited supply of built-in food, and extra fertilizer is needed for good growth, particularly if sown on a soil-less mix. Begin feeding the seedlings with a weak fertilizer solution immediately after germination.

4. An article about Lyndon Lyon in the excellent but now defunct "House Plants and Porch Gardens" spoke of his having developed African violets with green-edged star flowers. I can't locate these plants. What are the names of these African violets? Where can they be obtained?

That was a marvelous article in a greatly missed publication. Check the AVSA Master List for names of these plants. Or write to Lyndon Lyon, 14 Mutchler St., Dolgeville, NY 13329. He's the man with the answers although he probably does not have the varieties mentioned. His catalog lists his current hybrids.

5. It seems to me that it would be helpful in hybridizing if one could learn the ancestry of certain Saintpaulias. Is this possible?

Saintpaulias probably have the most scrambled genes of any plant. Some commercial growers have extensive records, but not for publication.

Did you know . . .

A recent federal government study, titled "Global 2000," found the world is losing an animal, insect or plant species at the rate of one per day, and may soon be losing them at the rate of one per hour. At that pace, one million species of life will disappear from the Earth in the next 18 years. How many undiscovered gesneriad species will be among those? Think about it.

Some Notes on Aeschynanthus

By William R. Saylor
Brewster, Mass.

A couple of questions on Aeschynanthus from Mike Marriott of Queensland, Australia, have been referred to me by your editors, and—although I can't really come up with positive answers—I am jumping at the chance to break into print once more. At least some of the information summarized here may be useful to breeders who have the urge to work with Aeschynanthus.

Now to Mike's questions:

Question (1) "Pollen from *A. hildebrandii* will produce pods on just about everything else, but it will not self nor will it be mother when crossed with any other species. Why?"

Answer: I have made only two or three unsuccessful attempts to use *A. hildebrandii* in breeding and so I cannot even corroborate Mike's findings. My reaction, as a breeder, is why get too concerned if this species will not set seed for you. In my experience a given primary cross and its reciprocal almost invariably produce the same results. Perhaps then species with long styles may not readily be fertilized, but others can readily be incorporated into a breeding program. Presumably, Bartley Schwarz' *A.* 'Big Apple,' which is *A. micranthus* X *A. hildebrandii*, is a good example.

Question (2) "To date I have been unable to use *A. speciosus* as pollen parent, but it will occasionally set seed from other species. Why?"

Answer: Although we know that *A. speciosus* is one of the parents of *A.* 'xSplendidus' and appears in the literature as a parent of 'Black Pagoda,' I don't think it has been listed specifically as pod or parent in either instance. At any rate it is a relatively simple matter to check the stainability of the pollen (if any) produced by your clone of *A. speciosus*. (See "CrossWords," Vol. I, No. 3, pg. 12 for staining procedure and Vol. V, No. 1, pg. 2 for a suggestion on use of a dental "disclosing solution" as a readily available stain.) If the pollen proves to be good we must go back to headscratching.

Question (3) "Has *A. albidus* (syn. *A. motleyi* and *A. purpurescens*) yet been used in hybridizing, as it flowers all along the stems, with one to two flowers at every node?"

Answer: I don't know of *A. albidus* having been used in any hybridizing programs, but it certainly has a good blooming habit. Now the breeder just has to introduce genes for brighter colors and larger flowers without losing the desirable traits on the way.

Mike also said he would like to see an Aeschynanthus stud list in "CrossWords." Herewith is a list of the named hybrids I have introduced or seen listed in growers' catalogs. Parentage has been listed when I know it:

Hybrid	Breeder	Parentage
'Bali'	Saylor	*A. pulcher* X *A. nummularius*
'Big Apple'	Schwarz	*A. micranthus* X *A. hildebrandii*
'Black Pagoda'	Lyon	*A. speciosus** X *A. longicaulis*
'Firecracker'	Saylor	*A. micranthus* X *A. parviflorus*
'Fireworks'	Saylor	(Sib of 'Firecracker') X *A. evrardii*
'Greensleeves'	Saylor	*A. tricolor* X *A. radicans*
'Holiday Bells'	Kartuz	
'Kalimantan'	Arndt	*A. speciosus** X *A. longicaulis*
'Laura'	Becker	*A. evrardii* X *A. micranthus*
'Little Tiger'	Saylor	*A.* 'Bali' X (*A. tricolor* X *A. praelongus*)
'Mandalay'	Saylor	*A. longicaulis* X *A. evrardii*
'Pullobia'	Hummel	*A. pulcher* X *A. lobbianus*
'Red Cascade'	Saylor	*A. pulcher* X *A. micranthus*
'xSplendidus'	T. Moore (circa 1851)	*A. parasiticus*** X *A. speciosus*
'Tiger Cub'	Ticknor	
'Tiger Stripe'	Saylor	*A. tricolor* X *A. pulcher*

* *A. speciosus* and *A.* 'xSplendidus' are frequently confused with one another. 'Black Pagoda' and 'Kalimantan' differ enough to suggest one or both may be of hybrid origin.

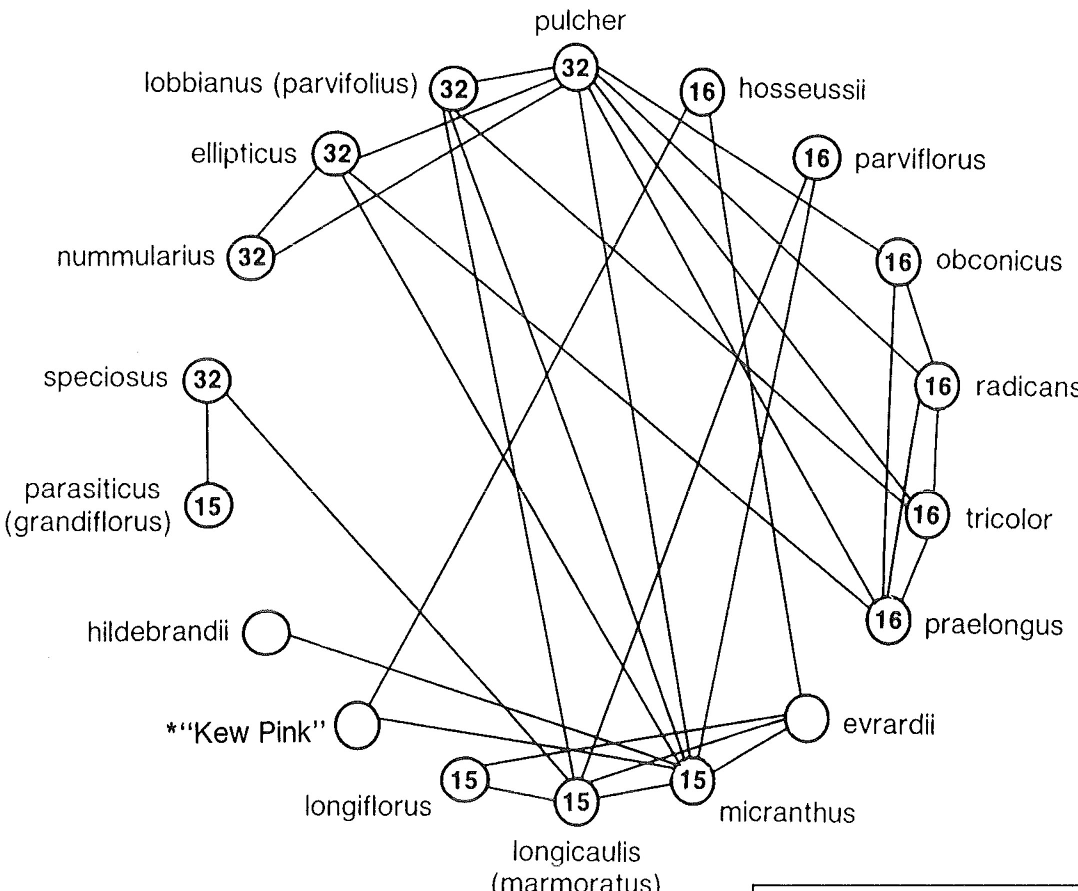
** synonym *A. grandiflorus*

(Continued)

Some Notes on Aeschynanthus (Continued)

The accompanying chart includes only Aeschynanthus species which have been interbred. All of the known primary crosses resulting in the previous list of named hybrids are included in the diagram and many other primary hybrids are also shown. The majority of these were not judged distinctive or worthy candidates for naming and introduction. There have also been a number of second and third generation hybrids that cannot be included conveniently in a chart of this type.

If other members will add the names of hybrids that have been missed perhaps we can ultimately produce a comprehensive stud list that can be added to as work progresses.



* Unidentified species carrying Bailey Hortorium acquisition number G-1481

AESCHYNANTHUS PRIMARY HYBRIDS
(known to the author)

All have flowered

Chromosome numbers (when known) in circles

Let me close with mention of an unidentified species from New Guinea collected by Huroo and distributed by Mary Dunnell and Peter Shalit some five or six years ago. The plant is a tiny leaved, vining and stem-rooting epiphyte with flexuous stems. It has intrigued me over the years because of its dainty habit in spite of the fact that it never could be persuaded to bloom. Until this year, that is. About two months ago my greenhouse plant developed flower buds, one per leaf axil, at the nodes of the last three or four leaf pairs on almost every stem. The cherry red flowers are about 1½ inches long, more than twice as long as the largest leaves. One seed pod has matured, producing seeds with the short hairy tufts typical of section Microtrichium commonly occurring in New Guinea. This one, it seems to me, would add much useful material to the breeders' gene pool.

Elementary Genetics

By Frances N. Batcheller
Durham, New Hampshire

Genetics is the science of variation and inheritance in organisms. It is a practical science. It involves biology with chemistry, physics and mathematics. For plant breeders, at least some knowledge of genetics is helpful. It can point the way to achieving desired results.

The term genetics was proposed by Bateson in 1906, but the important research to establish the basic principles of the science had been done by Gregor Mendel in his monastery garden in Austria. His wise choice of material — garden peas — enabled him to achieve results which have been repeated by other workers. Peas are self-pollinated, so uncontaminated by unwanted pollen. The types Mendel used had been in cultivation for many years and were pure lines (homozygous) so they would breed true. Perhaps luck was involved in the fact that the characters he chose, such as tall or short habit, smooth or wrinkled seeds, green or yellow cotyledons, were carried on different chromosomes, so the results were not confused by linkage factors; but careful records and attention to detail enabled Mendel to formulate his law of inheritance, establishing the principle that heredity characters are determined by discrete particles (genes) that segregate at random during gamete (reproductive cell) formation. Mendel read a paper giving his results in 1865, but it attracted little notice and was buried in an obscure publication, then rediscovered by several botanists about 1900. Despite the fact that Mendel had no knowledge of the fine structure of the cell, of chromosomes or genes, he correctly predicted the type of mechanism which was later found to exist.

If you have ever wondered what use there was for the annoying fruit fly that sometimes emerges from bananas and melons, it carries the science of genetics on its salivary glands. Genetic principles are the same for plants and animals. Scientists discovered that the fruit fly has four extremely large chromosomes in the glands of the larvae, large enough to see with a magnifying glass. The fruit fly is an obliging laboratory animal, prolific, with short generations, content to live in a jar feeding on a bit of fruit, and prone to mutations—which enable the geneticist to map the genes.

The genes, the units of inheritance, are now considered to be enzymes, each one triggering a particular chemical reaction. The genes are carried on a chromosome, which is a long thread-like body, usually tightly coiled up, but stretched out when the cell is preparing to divide. The genes are strung along the chromosome, rather like beads on a string. The passenger genes are more important than the carrier chromosome. Chromosomes come in pairs, and like genes, match up. These gene pairs are called alleles. Sometimes the allele pair has identical genes (homozygous), sometimes different (heterozygous). If the action of one heterozygous gene is apparent, the other masked, the combination is dominant-recessive. Sometimes the gene pairs have equal effect, giving a blending result.

Heredity depends on the orderly duplication of chromosomes. There are two kinds of chromosome division. Mitosis is simple duplication of the entire set of chromosomes, then separation into two identical daughter cells. This occurs in somatic, or body cells. A special kind of division—meiosis—is a reduction division, involving the germ cells. Here one set of chromosomes from the pollen parent and one set from the seed parent are combined to form a zygote. This ensures that the same chromosome number is maintained. Otherwise, without this reduction process, the chromosome number would keep increasing, as though the sorcerer's apprentice was at work. In fertilization, one gamete from each parent combines to form a zygote, a fertile seed or egg.

If the parents are homozygous, alike, or true breeding, both chromosomes are the same, the allele pairs of genes are the same, and the offspring are like the parents. However, if the alleles of a pair are different (heterozygous), random assortment takes place and hybridizing becomes an interesting procedure. It can be compared to shuffling a pack of cards, the gene pool.

To give a few simplified analogies, imagine pairs of red and white socks in a glass front washer. On a high speed spin, the color is pink, like blending inheritance. When it stops spinning, you can see the separate colors of red and white, like the genes which maintain their individuality no matter how they are combined. It is not like stirring a can of red paint into a can of white paint, the result forever pink. To further illustrate the dominant-recessive principle, you can mismatch the socks, roll them up so only one color shows, but they can be unrolled to reveal the components. Genotype is the term for the genetic constitution of an organism, phenotype is how it appears. With dominant-recessive heterozygous alleles, there would be different classes of genotypes and phenotypes. In homozygous alleles, the classes would be the same.

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Differences in gene pairs have come about by mutation. Without mutations, there would be no way to map genes. Mutations occur all the time, perhaps once in 10,000 gametes, at varying rates in different organisms. Mutations are sometimes striking enough to be noticeable, usually too small a fluctuation for observation. Scientists have discovered many ways of increasing the mutation rate—by irradiation, chemicals or temperature variations. Most mutations are useless or harmful, but occasionally, perhaps once in 1,000 times, there is an improvement. Here a watch makes a good analogy. It is very easy to think of ways to damage it, difficult to come up with an improvement.

For a few examples of plant breeding, consider a red-flowered plant (**RR**) crossed with a white-flowered one (**rr**):

Parental Generation
RR x rr

↓

First Filial Generation
F_1 = Rr

→ All plants Rr, with one allele from each parent. If R is dominant over r, all plants would be red. If there is no dominance, all plants would be pink.

↓

Second Filial Generation
F_2 = Rr x Rr

→ For a dominant-recessive pair, the ratio would be three red to one white with two phenotypes: RR and Rr (Red) and rr (white); three genotypes: RR, Rr and rr. The Rr plants would continue to segregate if selfed, the RR and rr would breed true. If there is no dominance, there would be three phenotypes: RR (red), Rr (pink) and rr (white). There would be three genotypes: RR, Rr and rr.

	R	r
R	RR	Rr
r	Rr	rr

↓

Back Cross - Test Cross
BC, Bx or RF_1 = RR or Rr x rr

→ Crossing the red flowers with the recessive white would indicate whether a red plant was Rr or RR. If RR, all the seedlings would be red. If the plant is Rr, the ratio would be 1:1 — half red, half white. If there is no dominance, such a test is unnecessary, as the pink Rr plants are self evident. Crossing to the dominant parent would not reveal the Rr genotype, as all plants would be red.

To add complications, try a dihybrid cross, using two pairs of alleles instead of one, which segregate independently. To illustrate this, imagine a red-flowered plant (**R**) with a green calyx (**G**) crossed with a white-flowered plant (**r**) with a white calyx (**g**). The capital letters represent the dominant alleles:

Parental Generation
RG x rg

↓

F_1

	R	r
G	RG	rG
g	Rg	rg

→ This would yield four phenotypes: red flower/green calyx (RG); red flower/white calyx (Rg); white flower/green calyx (rG); and white flower/white calyx (rg). There would also be four genotypes: RG, Rg, rG and rg.

↓

F_2

	RG	Rg	rG	rg
RG	RRGG	RRGg	RrGG	RrGg
Rg	RRGg	RRgg	RrGg	Rrgg
rG	RrGG	RrGg	rrGG	rrGg
rg	RrGg	Rrgg	rrGg	rrgg

→ This would yield a ratio of nine red/green; three red/white; three white/green and one white/white, for four phenotypes and nine genotypes: RRGG, RrGg, RrGG, RRGg, rrgg, rrGg, Rrgg, rrGG and RRgg. Note that the homozygous plants appear on the diagonal in this Punett square diagram.

(Continued)

To diagram a trihybrid, considering three gene pairs, would require 65 squares. Beyond that, it is necessary to use algebraic formulas, four gene pairs would yield 256 possibilities.

Practical plant breeding does not work out this neatly in most cases, as there are many genes involved, with varying effects. Large numbers of seedlings have to be grown to achieve perfect ratios. In theory, four tosses of a set of two coins should produce: both tails, two head and tail, both heads; but a little practical experimentation will soon show that the ratio of 1:2:1 seldom shows up in four tries.

Perhaps this material will offer at least a starting point to understanding the basic principles of genetics. Mendel achieved his results through wise choice of material and painstaking observation. He did not have facilities for complex chemical analysis, an electron microscope or a computer. Common sense can be as valuable as costly scientific equipment. There is still much that can be done by amateur hybridizers without expensive equipment, but patience and the ability to grow plants and keep records are still essential.

GLOSSARY:

Allele One of two alternate forms of a gene occupying the same place (locus) on a chromosome.

Back cross or test cross. Crossing a hybrid to one of the parental stocks.

Character A trait, quality, property or function distinguishing an individual.

Chromosome (colored body) A deep-staining thread-like body in the cell nucleus, visible at cell division. All species have characteristic chromosome numbers. The **n** number is found in the germ cells (haploid), the **2n** number in somatic cells (diploid).

Dominant The complete suppression of the expression of one allele by another at the same locus on the chromosome. The organism appears the same whether the allele is in single or double dose.

Enzyme A complex organic substance that accelerates (catalyzes) a specific chemical reaction. Genes produce their effects by the activation or inactivation of specific enzymes.

F1 First filial generation, the result of crossing two plants. If the parents are heterozygous, not alike, the seedlings will be hybrids, combining the parent genes. In crossing two species, or two pure lines, the F_1 does not produce much variation among the seedlings, as one chromosome set will be derived from each parent. The seedlings may be intermediate, or if dominance is operative, the seedlings may resemble one parent more than the other.

F2 Second filial generation is made by crossing seedlings of the same lot, or sib (sister-brother) matings. Segregation begins to take place with this generation, and a much larger number of seedlings need to be grown on to yield the inherent variety.

Gamete The reproductive male (pollen) or female (ovum) germ cell.

Gene The smallest indivisible material unit of heredity, capable of reproduction and mutation, linearly arranged in the chromosomes.

Genotype The genetic constitution or gene makeup of an organism.

Germ Cell Special reproductive cells produced by reduction division, haploid (half).

Heterozygous A hybrid of any gene pair having 2 different alleles in the two corresponding loci of a pair of chromosomes.

Homozygous Pure, having but one type of allele in both chromosomes of a pair.

Hybrid A cross of unlike organisms, having parents that are unlike, differing in one or more allele pairs.

Independent assortment Random or chance assortment in which distribution for one pair of alleles has no effect on the distribution of any other pair.

Linkage Genes linked together on the same chromosome, all the genes in one chromosome form one linkage-group.

Meiosis (smaller) Reduction division by two consecutive nuclear divisions yields the haploid chromosome number. This occurs in germ cells.

Mitosis (thread) Each chromosome duplicates, then splits longitudinally with equal distribution to daughter cells, occurs in somatic cells, yielding the diploid (double) number.

Mutation Sudden change in a gene, part or whole of a chromosome, which is permanently transmitted to the offspring. This provides the raw material for evolutionary change.

Phenotype (to appear) External appearance of an organism resulting from the interaction of its genotype and its environment.

Recessive The allele of a pair suppressed or masked by the dominant allele.

Somatic cell A cell in the body of the organism other than reproductive cells. Diploid in number.

Zygote Result of fusion of male and female gametes—ovum fertilized by pollen.

This is your newsletter. The editors edit, gladly and for free, but we must have something to edit. We depend on your generosity. We encourage guilt . . . if it gets some response.

Remember that there are now three issues of "CrossWords" per year. Your next issue will be mailed to you in April, 1983. Hybridize during the long winter months and write us about it.

Miniature Sinningia Stud List

By Claire Roberts
2119 Pile, Clovis, New Mexico 88101

This Miniature Sinningia Stud List contains both older hybrids already listed in the 1975 Sinningia Register and new hybrids created in the past few years. I am now working on the revision of the Sinningia Register and would like to make it as complete as possible. The number of new hybrids listed turned out to be less than I expected. The reason is that information about parentage just isn't available for many of the hybrids now on the market. Therefore I would appreciate hearing from hybridizers concerning their work. Also, if any of the following information is incorrect, please let me know. Sometimes contradictory information is published about various hybrids, and I don't know what is correct unless I can go to the source — the hybridizer. As I learn more, I'll keep you updated.

SINNINGIA	SEED PARENT	POLLEN PARENT	HYBRIDIZER
'April Snow' — sport of 'April Starr'			Small
'April Starr'			Small
'Baby Blue'	'Hircon'	'Foxey Blue'	Schwarz
'Baby Doll'	'Dollbaby'	aggregata	
'Blushing Cindy'	'Cindy-ella'*	'Krishna'	Schwarz
'Benten'	'Ramadeva'	barbata	Batcheller
'Black Light'	'Scarlet Red'	eumorpha X cardinalis X mini-pink	Schwarz
'Bob W.'	'Dollbaby' X unnamed hybrid	unnamed hybrid	Bona
'Bright Eyes'	'Wood Nymph'	pusilla	Clayberg
'Cherry Chips'	'Cindy-ella'	'Scarlet Red'	
'Cindy'	concinna	eumorpha	Talpey
'Cindybaby'	'Cindy-ella'	'Dollbaby'	Lyon
'Cindy-ella' — tetraploid of 'Cindy', colchicine induced			Nixon
'Claire's Choice'	'Hircon'	'Little Imp'	Guyett
'Connecticut Hybrids'	pusilla X eumorpha	pusilla X (eumorpha X cardinalis)	Clayberg
'Coral Baby'	'Modesta'	cardinalis 'George Kalmbacher'	Nixon
'Cupid's Doll'	'Dollbaby'	'Ramadeva'	Katzenberger
'Dollbaby'	pusilla	eumorpha	Katzenberger
'Donlyn'	eumorpha	'Dollbaby'	Lyon
'Foxey Blue'	'Dollbaby'	'Cindy-ella'*	Schwarz
'Freckles'	concinna	hirsuta	Clayberg
'Golliwog'	'White Sprite'	'Dollbaby'	Nixon
'Grace M.'	eumorpha	'Dollbaby'	Wyrtzen
'Hircon' — tetraploid of 'Freckles,' colchicine induced			Nixon
'Hot Strawberry'	'Cindy-ella'*	'Scarlet Red' F_2 selection	Schwarz
'Jason'	'Scarlet Red'	'Mother of Pearl' X 'Pink Ice'	Mines
'Kalinka'	'Pink Imp'	'Dollbaby'	Nash
'Kore'	'Ramadeva'	richii	Batcheller
'Krishna' — tetraploid of 'Ramadeva'			Batcheller
'Laura' — seedling of 'Purple Crest,' selfed			Lyon
'Laurie M.' F_3 selection	'Mother of Pearl'	'Pink Ice'	Mines
'Leo'	'Foxey Blue'	unnamed seedling	Schwarz
'Little Imp'	'Pink Petite'	pusilla X (eumorpha X cardinalis)	Clayberg
'Love Song'	'Dollbaby'	unnamed hybrid	Bona

(Continued)

SINNINGIA	SEED PARENT	POLLEN PARENT	HYBRIDIZER
'Love Spot' — seedling of 'Mod Imp,' selfed			Lyon
'Maiden's Blush'	'Modesta' X lav./pnk. mini	'Innocent' X eumorpha	
'Mathild'	'Ramadeva'	regina	Nixon
'Merlin Hybrids' — seed line involving pusilla, eumorpha, canescens and cardinalis			Batcheller
'Misty'	'Cindy-ella' F_2	'Pink Imp'	Belanger
'Minarette'	'Modesta'	'Little Imp'	Kartuz
'Mod Imp'	'Modesta'	'Patty Ann'	Kartuz
'Modesta'	'White Sprite'	canescens	Bernard
'Molly L.'	'Hircon'	'Mother of Pearl'	Schwarz
'Mother of Pearl' — complex hybrid possibly involving 'White Sprite' and canescens. Origin unclear. Hybridizer unknown.			
'Norma Jean'	'Dollbaby'	'Little Imp'	Bernard
'Oengus'	concinna X schiffneri	'Krishna'	Batcheller
'Patty Ann'	'Modesta'	'Little Imp'	Bernard
'Pink Flare'	'Ramadeva'	'Pink Petite' X 'Dollbaby'	Rosenblum
'Pink Ice'			Small
'Pink Imp'	'Pink Petite'	pusilla X (eumorpha X cardinalis)	Clayberg
'Pink Petite'	pusilla	canescens	Clayberg
'Pinochio'	'Hircon'	'Cindy-ella'*	Schwarz
'Poupee'	'White Sprite'	'Dollbaby'	Nixon
'Premiere White' — another name for 'Venus de Milo'			Schwarz
x-pumilla	pusilla	eumorpha	Clayberg
'Purple Crest' — F_2 or F_3 selection of 'Cindy-ella' X 'Dollbaby'			Lyon
'Purple Dollbaby'	eumorpha	'Dollbaby'	Lyon
'Ramadeva'	pusilla	canescens	Batcheller
'Ruby' — seedling of 'Mod Imp,' selfed			Lyon
'Ruby Throated Dollbaby'	'Dollbaby'	'Cupid's Doll'	Woodruff
'Silhouette'	'Cindy-ella'	'Pink Imp'	Belanger
'Snowflake'	'White Sprite'	pusilla, chemically induced mutant	Clayberg
'Splashes'	'Silhouette'	'Cindy-ella'	Belanger
'Star Eyes'	'Snowflake'	'Bright Eyes'	Belanger
'Stuck Up'	'Cindybaby'	'Hircon'	Lyon
'Super Orange' — Salmon sibling of 'Venus de Milo' carried two generations for darker color			Schwarz
'Super Red'	'Scarlet Red' F_2 selection	'Venus de Milo'	Schwarz
'Ted Bona' — sport of 'Leo,' through tissue culturing			Mines
'Tiger'	'Cindybaby'	'Hircon'	Lyon
'Tinkerbells'	concinna	aggregata	Jordan
'Tutu' — vegetative sport of 'Golliwog'			
'Venus De Milo'	'Mother of Pearl'	(cardinalis X eumorpha) X 'Snowflake'	Schwarz
'Winkie'	pusilla	'Dollbaby'	
'Wood Nymph'	pusilla	concinna	Lyon
'Wood Nymph Improved'	'Wood Nymph'	concinna	Lyon
'Zoe'	'Dollbaby' X eumorpha	richii	White

* — (Editors' Note: Bartley Schwarz has reported that he used a "fertile 'Cindy' " in many of his hybrids, not 'Cindy-ella.' The fertile 'Cindy' he used is "a spontaneous polyploid that just showed up in my propagations." However, since 'Cindy-ella' is a fertile tetraploid form of 'Cindy,' and because there has been no controlled study to distinguish Bartley's fertile 'Cindy' from 'Cindy-ella,' we will refer to it as 'Cindy-ella' in order to avoid confusion.)

Genetics of Corolla Traits in Gloxinia *(Sinningia speciosa)*

By Carl D. Clayberg
Kansas State University, Manhattan, Kansas

(Editors' Note: In the last issue of "CrossWords," a member asked for information about color inheritance in Sinningias. Carl Clayberg sent along this reprint of an article he wrote for "The Journal of Heredity" [66:10-12, 1975]).

The florists' gloxinia, *Sinningia speciosa,* (Loddigies) Hiern, is an important ornamental pot plant widely grown for its large, showy flowers. Since its introduction into Europe from southeastern Brazil in 1817, thousands of cultivars have been developed, encompassing a wide range of variability in corolla shape, size and coloration. Most of this variability is still present in modern strains, but the inheritance of only one trait has been reported: dominance of nodding (zygomorphic) over erect (actinomorphic) corolla shape. Because Storck[7] failed to assign a symbol and epithet to this gene, it is here given the name, actinomorphic *a.* This paper describes seven additional genes and tests for their linkage.

Materials

Four true-breeding strains were used in the crosses described here. They each have been grown for three to five generations and have shown no segregation. 'Dark Blue,' 'Fire King,' 'Queen Victoria,' and 'Schweitzerland' were obtained from the George W. Park Seed Company, Greenwood, South Carolina. The corolla limb of 'Dark Blue' is a very dark undotted purple, darker and more saturated than hue 79A of the Royal Horticultural Society Colour Chart, and shades to white finely dotted with dark purple in the basal half of the corolla tube interior. 'Fire King' has an undotted corolla limb of bright crimson (53A), shading narrowly and gradually at the lobe margins to pink (63C). The throat interior is undotted 53A in the distal half, shading abruptly to light red-purple (63C) finely dotted with dark red-purple (64A) in the basal half. 'Queen Victoria' has a pùre white undotted corolla, with a faint greenish tint within the tube. This cultivar is incorrectly identified, since the original 'Queen Victoria,' named before 1881, had a red corolla with a white margin[3]. The corolla of 'Schweitzerland' is colored like 'Fire King' except for a white exterior and a pronounced white margin, 2-3 mm wide, on the interior limb. One double-flowered cultivar was used, 'Royal Blue,' from the Henry F. Mitchell Company, King of Prussia, Pennsylvania. It has the same corolla color and markings as 'Dark Blue' but segregates for the double-flowered trait. Homozygous, double-flowered gloxinias are poor pollen and/or seed producers, so they are increased commercially by self-pollinating heterozygotes or sib-crossing doubles with singles. One "tigrina" (spotted) hybrid, from Buell's Greenhouses, Eastford, Connecticut, was tested. It had a white corolla with interior limb and tube heavily marked throughout by red dots 0.2-0.8 mm in diameter. All of these cultivars have erect corollas.

Glossary: From: "The Living Plant" by Alan J. Brook

actinomorphic: star-shaped; therefore radially symmetrical, and divisible into two similar parts by more than one plane passing through the center. Used here, it signifies the upright, trumpet-shaped *Sinningia speciosa*.

alleles: genes situated at comparable positions in the two halves of a pair of chromosomes.

anthocyanin: the sugar-based, water soluble coloring pigment of many plants and flowers. Produces blue to red colors.

genotype: a group of individuals all of which possess the same genetic makeup.

heterozygous: possessing both the dominant and the recessive characters of a pair of genes.

homozygous: the condition of having inherited a given genetical factor from both parents, and therefore producing genes of only one kind.

linkage group: a group of hereditary characteristics which remain associated with one another through a number of generations.

phenotype: one of a group of individuals all of which have a similar appearance regardless of their genetic makeup.

segregation: the separation of hereditary factors from one another during meiosis, hence into different offspring.

zygomorphic: divisible into equal halves by one plane only. Nodding, or slipper-shaped.

Results

It is clear from the earliest descriptions of *S. speciosa*, as well as from its close relatives *S. discolor* (Decaisne ex Hanstein) Sprague, and *S. regina* Sprague, that despite its variability the wild type of this species is characterized by nodding (zygomorphic), single-flowered, purple corollas

(Continued)

spotted only basally within the tube. Although wild collections are no longer available, symbols have been assigned to the following genes in accordance with this description. The genes are characterized under the crosses in which they segregated.

'Royal Blue' X 'Schweitzerland'

Double-flowered hybrids of 'Royal Blue' X 'Schweitzerland' ($D\,D^+\,r^+r^+\,wm^+\,wm^+$ X $D^+\,D^+\,r\,r\,wm\,wm$) resembled the 'Royal Blue' parent except that the corolla limb color faded slightly at the margin. The backcross to 'Schweitzerland' assorted independently for three gene pairs (Table I, Tests 1-3).

Double

Double (D) flowers have up to three times the petalage of a single-flowered corolla. Petals of the inner whorls are irregularly connate (joined together), so that the hose-in-hose effect typical of double-flowered azaleas is uncommon. Stamens are often petiolate (having a stalk) or anthers without pollen. The heterozygote occasionally has markedly fewer petals than the double-flowered homozygote, and both grow more slowly than $D^+\,D^+$ plants.

Red

Red corolla limb is determined by the gene r, which is fully recessive to its allele r^+ causing purple corolla limb.

White Margin

The white margin allele (*wm*) when homozygous produces the white limb margin of 'Schweitzerland.' In the heterozygote the color fades slightly at the margin but no pronounced zone occurs, so that *wm* is best treated as a recessive gene.

'Dark Blue' X 'Queen Victoria'

In the cross 'Dark Blue' X 'Queen Victoria' ($r^+\,r^+\,w\text{-}2^+\,w\text{-}2^+$ X $r\,r\,w\text{-}2\,w\text{-}2$) the corolla limb of the F_1 was an undotted light blue (82A) in the lobe centers shading to a slightly lighter margin (91B) and to white dotted basally in red-purple within the tube. The F_2 and backcross to 'Queen Victoria' segregated for *r* and *w-2*, which were unlinked. (Table I, Tests 4 and 5).

White-2

The white-2 $^+$ ($w\text{-}2^+$) allele causes pigment to be produced in corolla limb and tube and is additive in its expression. It is numbered to distinguish it from *w*, described in *Sinningia pusilla*[1], so that mimics within the genus will

Table I: Summary of linkage tests

Test no.*	Generation and phase**		Gene combination a	b	Observed frequencies ++	+b	a+	ab	x^2***	P
1	B	R	D	r	60	72	80	81	3.86	>0.20
2	B	R	D	wm	73	59	69	92	7.82	=0.05
3	B	C	r	wm	67	73	75	78	0.88	>0.80
4	F_2	C	w-2	r	146	49	(59)		0.43	>0.80
5	B	C	w-2	r	66	49	(122)		2.64	>0.20
6	B	C	w-2	en(w-2)	(160)		65	75	2.00	>0.30
7	F_2	C	w-2	en(w-2)	(230)		49	9	5.87	>0.05
8	F_2	C	r	wlg	305	89	116	26	5.43	>0.10
9	F_2	C	wlg	S-3	106	288	34	108	1.47	>0.50
10	F_2	C	wlg	S-3	115	306	25	90	5.42	>0.10

* — Test 1-3 are of a single backcross family; 8-10 are of a single F2 family
** — C = coupling; R = repulsion
*** — Chi squares were calculated for fit to ratios expected for independent assortment, i.e., to a 1:1:1:1 in 1-3, a 9:3:4 in 4, a 2:1:1 in 5 and 6, a 12:3:1 in 7, and a 9:3:3:1 in 8-10.

receive different symbols regardless of species. Testing of *w* and *w-2* for allelism is not possible because hybrids cannot be obtained between *S. pusilla* and *S. speciosa.* The *w-2 w-2* genotype always lacks basal dotting within the tube, while limb color is completely or partially suppressed. Tube dotting is present in the heterozygote and limb color is diluted to pink (*r r*) or light blue (r^+ r^+ or r^+ *r*). For scoring purposes *w-2* is considered as completely recessive, since other genes modify its degree of expression.

'Fire King' X 'Queen Victoria'

In the cross 'Fire King' X 'Queen Victoria' [*r r en(w-2)*$^+$ *en(w-2)*$^+$ *w-2*$^+$ *w-2*$^+$ X *r r en(w-2) en(w-2) w-2 w-2*], the F_1 had a corolla limb of pink (57C) gradually shading to a lighter margin (62C) and within the tube to white dotted basally with red-purple. The F_2 and backcross to 'Queen Victoria' gave, in addition to the parental and F_1 classes, a new phenotype with a white undotted tube interior and reduced limb pigmentation, expressed either as a uniformly diluted color all over, similar to the *w-2* heterozygote except for the abscence of tube dotting, or as a variable submarginal banding or blotching of diluted color on an otherwise white limb. This phenotype was due to the following gene.

Enhancer of w-2

In order for the *w-2 w-2* genotype to have a fully white limb it must also be *en(w-2) en(w-2).* The *en(w-2)* allele is fully recessive and hypostatic (cancels the effects) to *w-2*$^+$. In *w-2 w-2* genotypes *en(w-2)*$^+$ causes the diluted or blotched limb pigmentation and undotted white tube interior. This phenotype was absent from the previous cross because 'Dark Blue' is *en(w-2) en(w-2).* The *en(w-2)* allele, which was formerly[2] called *wl*, is unlinked with *w-2.* (Table I, Tests 6 and 7).

'Dark Blue' X "tigrina"

The original "tigrina" hybrid proved to be heterozygous for a spotting gene, called *S-3* since two spotting genes have already been described in Sinningia.[1] A homozygous *S-3 S-3* derivative was used in the cross 'Dark Blue' X "tigrina" (r^+ r^+ *S-3*$^+$ *S-3*$^+$ *wlg*$^+$ X *r r S-3 S-3 wlg wlg*), which segregated for *S-3, r,* and a third gene *wlg.* All three were unlinked. (Table I, Tests 8-10).

Spotted-3

The spotted-3 (*S-3*) allele causes the interior corolla limb to be marked all over with small dots in shades of red or purple. Dot size depends on dosage: dots of *S-3 S-3* genotypes are about 1.0-1.6 mm in diameter, those of heterozygotes 0.2-0.8 mm. Dots can be distinguished regardless of the degree of ground pigmentation. In all three genotypes the tube interior is dotted basally, and both limb and tube pigmentation are fully suppressed in the *w-2 w-2* genotype, while the color intensity of the limb dotting is reduced in heterozygotes for *w-2.* When homozygous, *S-3* usually reduced pollen production markedly, but female fertility is not affected.

White Limb Ground

The white limb ground (*wlg*) allele is a fully recessive gene for white limb ground color whose expression is epistatic (suppresses the effect of a gene) to *w-2*$^+$ and independent of *S-3.* In the *S-3*$^+$ *S-3*$^+$ *w-2*$^+$ *w-2*$^+$ *wlg wlg* genotype segregation for *r* can be scored due to the development of color at the lobe intersections, which is frequently absent in the heterozygote for *w-2.* Tube spotting in these genotypes is the same red-purple shade regardless of segregation for *r* and hence does not permit scoring of this gene.

Discussion

Gloxinias (Sinningias) are generally sold commercially as 1- or 2-year-old plants, started from seed often of hybrid origin. Knowledge of the inheritance of the seven genes described here should enable breeders to produce controlled hybrids of desired types. For instance, a variable hybrid seedling blend with pastel-colored flowers would result from a cross of *w-2*$^+$ *w-2*$^+$ r^+*r S-3 S-3*$^+$ *wlg*$^+$ *wlg* X *w-2 w-2 r r S-3*$^+$ *S-3*$^+$ *wlg wlg.* This particular blend would contain four phenotypes in light blue and in pink, eight equally frequent types in all. Other hybrid blends could

(Continued)

be obtained by appropriate selection of parents; one such, called Slipper Time Series and segregating for *r* and *wm*, has been developed and sold by Lyndon Lyon, Dolgeville, New York.

It is interesting to compare Sinningia to Streptocarpus, the only other genus in the family Gesneriaceae where flower color has been analyzed. In Streptocarpus[6] there are two genes that are necessary for the production of anthocyanin in the flowers: *V*, which also causes it to be produced in the leaves and stems; and *F*, which is additive in expression and hypostatic to *v*. Like *f*, the *w-2* allele of *S. speciosa* is additive but differs in restricting foliar anthocyanin to stems and petioles when homozygous. Three genes in Streptocarpus control the color of the corolla by altering the structure of the anthocyanin: *D* affects glycosidation (decomposition of glycose), and *O* and *R* cause methylation. The *r* allele results in pelargonidin instead of cyanidin (*R*) (both are coloring pigments), and hence may be analogous to *r* of *S. speciosa*, since both of these pigments have been found in this species.[4] None of four other genes for flower color pattern in Streptocarpus[5] is analogous to those reported here.

Summary

Seven genes are described affecting corolla shape, color and color pattern in *Sinningia speciosa* (Gesneriaceae). Tests for linkage are reported but none was found.

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Comments on the G.H.A. Hybrid Award

Gloria Kahle
Tacoma, Washington

At the annual meeting in Sarasota there was a discourse on awards for newly introduced plants, but I don't believe we arrived at any conclusion. With new plant material shown in only one location and taking so long to cover the country, it is hard to put to a vote a plant that so few have seen.

I wonder if the person wishing to nominate a plant for the award could send cuttings to at least three areas of the country where the plant could be grown and shown and perhaps, evaluated. For instance, if I receive a cutting (and pay for same) I could grow it and enter it in our Seattle chapter show. We have judges from Portland, Oregon, Vancouver-Victoria, B.C. and our Washington State who could evaluate and judge the plant. I'm sure other states get together as they do in New England.

INTERGENERIC HYBRID CHART

The following chart was designed to be a brief guide to gesneriad intergeneric hybrids. Technical information has been kept to a minimum. Anyone wishing more detailed information should consult the references listed at the end of the article. Special thanks to Frances Batcheller for her assistance in compiling this chart.

— *Al Wojcik*

	Achimenes	Aeschynanthus	Dalbergaria	Eucodonia	Gesneria	Gloxinia	Heppiella	Kohleria	Monopyle	Nematanthus	Ophithandra	Pentadenia	Ramonda	Sarmienta	Smithiantha	Solenophora	Trichantha
Achimenes				1											2		
Agalmyla		3															
Briggsia											4						
Codonanthe										5							
Columnea			6									7					8
Dalbergaria												9					10
Diastema								11									
Gloxinia				12				13	14						15		
Heppiella	16					17									18		
Hypocyrta										19							
Jankaea													20				
Koellikeria								21									
Mitraria														22			
Moussonia						23		24							25	26	
Niphaea	27														28		
Parakohleria								29									
Rhytidophyllum					30												
Smithiantha				31			32										
Trichantha												33					

(1) ***xAchicodonia* (Achimenes X Eucodonia)** Wiehler. *xAchicodonia eucodonioides:* Reported as *Plectopoma x-eucodonioides* by Van Houtte (1869-1870). *Achimenes glabrata* X *Eucodonia verticillata:* Hybrid produced by L. Van Houette around 1868. Ten hybrids between species of Achimenes and *Eucodonia verticillata* and *E. andrieuxii* were produced at Cornell University in the early 1960s.

(2) ***xAchimenantha* (Achimenes X Smithiantha)** *xAchimenantha naegelioides: Achimenes glabrata* X *Smithiantha zebrina:* Hybrid produced by L. Van Houette in Belgium around 1866. Ten additional hybrids between Achimenes and Smithiantha were produced at Cornell University in the early 1960s. Replaces the illegitimate (incorrectly formed) former name x*Eucodonopsis.* Named hybrids include: 'Kuan Yin,' 'Tammuz,' 'Arundel,' 'Tintagel,' 'Diamond Lil,' 'Mary Anne,' 'Mitsu,' 'Cerulean Mink,' and the Cornell series, 'Treasure,' 'Aristocrat,' 'Royal,' 'Sterling' and 'Sunshine.'

(Continued)

(3) *xAgalnanthus* (Agalmyla X Aeschynanthus) (in ed.) Masterson.

(4) *xBrigandra* (Briggsia X Ophithandra) Burtt, 1980. This was originally published as *xGomicharis* by Dr. Schwarz, but as it was not correctly formed, it was changed by Mr. Burtt. It is now being propagated in Germany by tissue culture.

(5) *xCodonatanthus* (Codonanthe X Nematanthus) First introduced in 1977 by Bill Saylor. Hybrids include 'Fiesta,' 'Antique Gold,' 'Rosy Glow,' 'Tambourine,' and 'Aurora.'

(6) *xColbergaria* (Columnea X Dalbergaria) Wiehler. *Columnea erythrophaea* X *Dalbergaria perpulchra:* Herbarium specimens: "Wiehler 7421," Jan. 28, 1974. *Columnea querceti* X *Dalbergaria perpulchra:* Herbarium specimens: "Wiehler 75259," Nov. 4, 1975. *Columnea crassifolia* X *Dalbergaria perpulchra:* Herbarium specimens: "Wiehler 7329," Oct. 7, 1973.

(7) *xColtadenia* (Columnea X Pentadenia) Wiehler. *Columnea verecunda* X *Pentadenia* sp. (*P. zapotalana*): Herbarium specimens: "Wiehler 7310," Feb. 16, 1973. *Columnea verecunda* X *Pentadenia* sp. (*P. angustata*, reported by Sherk & Lee [1967] as "sp. G-361").

(8) *xColtrichantha* (Columnea X Trichantha) Wiehler. *Columnea crassifolia* X *Trichantha dissimilis:* Herbarium specimens: "Wiehler 7422," Jan. 21, 1974. *Trichantha purpureovittata* X *Columnea flaccida:* Herbarium specimens: "Wiehler 7324," April 14, 1973. *Columnea wilsonii* X *Trichantha brenneri:* Herbarium specimens: "Wiehler 75260," June 15, 1975. *Columnea wilsonii* X *Trichantha tenensis:* Herbarium specimens: "Wiehler 75261," June 15, 1975. *Trichantha illepida* X *Columnea hirta* var. *mortonii:* Produced by L.C. Sherk, Plant Research Institute, Ottawa, Canada, around 1967. Herbarium specimens: "Wiehler 7019," March 8, 1970; "Wiehler 72351a," Nov. 14, 1972. *xColtrichantha* 'Canary': *Columnea verecunda* X *Trichantha moorei:* Produced by Sherk & Lee (1967) at Cornell University. Herbarium specimens: at Bailey Hortorium and "Wiehler 7423," Feb. 4, 1974 (Selby). Lee & Sherk (1963) and Sherk & Lee (1967) cite 21 other combinations of xColtrichantha, all of them with 0% hybrid pollen stainability. The intergeneric sterility between Columnea and Trichantha stands in sharp contrast to the high percentage of fertility of their interspecific hybrids within Columnea and within Trichantha.

(9) *xDaltadenia* (Dalbergia X Pentadenia) Wiehler. *Dalbergaria perpulchra* X *Pentadenia sericea:* Herbarium specimens: "Wiehler 75263," July 10, 1975.

(10) *xDaltrichantha* (Dalbergaria X Trichantha) *xDaltrichantha* 'Campus Favorite': *Dalbergaria sanguinea* (= *Columnea affinis* Morton) X *Trichantha sanguinolenta:* This cross was made twice: in 1960 at Cornell University by Lee & Sherk (1963, p. 176, with the cultivar epithet 'Campus Favorite,') and by Hans Wiehler at the same institution in 1967. Herbarium specimens at BH, and "Wiehler 75262," July 8, 1975 (Selby).

(11) *xDiaskohleria* (Diastema X Kohleria) Wiehler. *Diastema vexans* X *Kohleria spicata*. Herbarium specimens: "Wiehler 6910," April 8, 1969; "Wiehler 75258," July 20, 1975. Not seen in the trade.

(12) *xGlocodonia* (Gloxinia X Eucodonia) Wiehler (1970). *Gloxinia lindeniana* X *Eucodonia verticillata:* Herbarium specimens, "Wiehler 7059," Oct. 25, 1970.

(13) *xGlokohleria* (Gloxinia X Kohleria) Wiehler (1968) *Gloxinia sylvatica* X *Kohleria spicata:* Herbarium specimens: "Wiehler 69139," Dec. 9, 1969. *Gloxinia gymnostoma* X *Kohleria eriantha*: Herbarium specimens: "Wiehler 7209," April 21, 1972. *Gloxinia sylvatica* X *Kohleria lanata:* Herbarium specimens: "Wiehler 6807," Dec. 11, 1968; "Wiehler 6907," Aug. 9, 1969. *xGlokohleria* 'Emberglo': *Kohleria* 'Rongo' X *Gloxinia sylvatica.*

(14) *xGloxinopyle* (Gloxinia X Monopyle) Wiehler. *Monopyle maxonii* X *Gloxinia perennis:* Pollinated Sept. 8, 1971, flowered Nov., 1972, but no herbarium specimen made. Unlisted commercially.

(15) *xGloxinantha* (Gloxinia X Smithiantha) R.E. Lee. *Gloxinia perennis* X *Smithiantha multiflora:* Hybrid

(Continued)

produced by R.E. Lee, summer, 1966. *Gloxinia perennis* X *Smithiantha fulgida:* Hybrid produced by Hans Wiehler, pollination occurred on November 2, 1967; reciprocal cross did not take. Replaces the improperly formed previous name "Smithennis" still found in limited use. *xGloxinantha* 'Evlo': Smithiantha hybrid X *Gloxinia perennis.*

(16) *xHeppimenes* (Heppiella X Achimenes) (1978) *xHeppimenes* 'Tezli': *Heppiella viscida* X *Achimenes dulcis.* Not listed in the trade.

(17) *xHeppigloxinia* (Heppiella X Gloxinia) Wiehler (1971). *Heppiella viscida* X *Gloxinia nematanthodes:* Herbarium specimens: "Wiehler 71339," Oct. 12, 1971. Not listed in the trade.

(18) *xHeppiantha* (Heppiella X Smithiantha) (1955) Not listed in the trade.

(19) *xHypotanthus* (Hypocyrta X Nematanthus) (1971) Considered by A.G.G.S. as interspecific crosses of Nematanthus.

(20) *xJankaeamonda* (Jankaea X Ramonda) Van Dedem 1922. Believed to be available in Europe.

(21) *xKoellikohleria* (Koellikeria X Kohleria) Wiehler (1968). *xKoellikohleria rosea: Koellikeria erinoides* X *Kohleria spicata:* Pollinated July 25, 1967; reciprocal cross did not take.

(22) *xMitramienta* (Mitraria X Sarmienta) Wiehler.

(23) *xMoussogloxinia* (Moussonia X Gloxinia) Wiehler (1968). *Moussonia elegans* X *Gloxinia gymnostoma:* Herbarium specimens: "Wiehler 6804," Aug. 15, 1968. *Moussonia hirsutissima* X *Gloxinia gymnostoma:* Herbarium specimens: "Wiehler 6805," Aug. 15, 1968. *Moussonia hirsutissima* X *Gloxinia nematanthodes.* None seen in the trade.

(24) *xMoussokohleria* (Moussonia X Kohleria) Wiehler. *Moussonia elegans* X *Kohleria digitaliflora:* Herbarium specimens: "Wiehler 69143," Dec. 9, 1969. "Wiehler 7328," Dec. 3, 1973. Not seen in the trade.

(25) *xMoussoniantha* (Moussonia X Smithiantha) Wiehler (1976) *xMoussoniantha cornellana:* Produced at Cornell University; pollinated July 27, 1967, sown on Oct. 2, 1967, first flowered on April 2, 1968. Plants without scaly rhizomes, requiring no dormancy; both parents native to same area in Prov. Oaxaca, Mexico. Herbarium specimens: "Wiehler 6803," July 8, 1968.

(26) *xMoussonophora* (Moussonia X Solenophora) Wiehler (1969). *Moussonia hirsutissima* X *Solenophora insignis.* Pollinated April 16, 1967, flowered in 1969, but no herbarium specimen was made. *Moussonia hirsutissima* X *Solenaphora sp.* (G-911, *S. tuxtla* Denham): Herbarium specimen: "Wiehler 69144." Dec. 12, 1969. Neither are presently in the trade.

(27) *xNiphimenes* (Niphaea X Achimenes) One hybrid reported: *xNiphimenes* 'Lemonade' by Patrick Worley. Listed in Kartuz' catalog supplement (1982).

(28) *xNiphiantha* (Niphaea X Smithiantha) Unseen in the trade.

(29) *xPaleria* (Parakohleria X Kohleria) Unseen in the trade.

(30) *xRhytidoneria* (Rhytidophyllum X Gesneria) (1976) Not seen in the trade. Possible natural hybrid reported in the wild (1982), but unverified.

(31) *xSmithicodonia* (Smithiantha X Eucodonia) Wiehler (1976). *Eucodonia verticillata* X *Smithiantha zebrina:* Hybrid produced by L. Van Houtte in Belgium around 1864. Two additional hybrids were produced at Cornell University in the early 1960s: *Smithiantha multiflora* X *Eucodonia verticillata* and *S. multiflora* X *E. andrieuxii.* (Cooke and Lee, 1966).

(Continued)

(32) ***xSmitheppiella*** **(Smithiantha X Heppiella)** (1857) *xSmitheppiella naegelioides:* reported as *Heppiella x-naegelioides* by Lem., Ill. Hort. 4:pl. 129. 1857: *Smithiantha zebrina* X *Heppiella viscida* (Lindl. & Paxt.) Fritsch (as *H. atrosanguinea* Regel in text). This hybrid combination has not been duplicated since Lemaire's time.

(33) ***xTrichadenia*** **(Trichantha X Pentadenia)** Wiehler. *Pentadenia sericea* X *Trichantha brenneri:* Herbarium specimens: "Wiehler 75264," July 10, 1975. Unseen in the trade.

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Change Your Labels!

Sinningia 'New Zealand' has been identified as *Sinningia reitzii* by Dr. Hans Wiehler. The species was originally collected in Brazil.

New Introductions

By Ron Myhr
Claremont, Ontario, Canada

I finally got around to propagating the four plants that I am going to introduce. These are selections from my crosses between white and pink forms of *Sinningia eumorpha*, which I'm going to call 'Pale Beauty' if the name isn't already in use and three Streptocarpus that I've finally settled on. These are conventionally sized plants, although I don't think that they're quite as large as the Nymphs. One is a clear but delicate shade of warm lavender with darker markings, another a pale blue very floriferous cross between 'Wintermint' and *johannis,* with a single fine purple line down the center of the lower face, and the third a cross back from this to *johannis.* This latter is the most interesting, being the first example of what I set out to do in Streptocarpus hybridizing. It has a multitude of very small pale blue flowers, similar to those on *johannis* but slightly larger. Stems are fairly strong, and each will have up to 12 flowers open at once. The net effect of a well-grown plant is quite spectacular.

Given time and luck, I hope to do the same in other colors. This will not be easy — the large percentage of *johannis* means I'll have to go at least one, maybe two, more generations from the initial cross, always growing many seedlings.

BACK ISSUES

Back issues of "CrossWords" may be obtained from Zelda Mines, 2206 East 66th St., Brooklyn, New York 11234.

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