The Collected Articles

BLUE CATTLEYAS

By Carson E. Whitlow

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Note: This collection of articles, with supplementary material, was published in a booklet form and sold by Twin Oaks Books in about 1992. Only about 100 copies were printed, with most of them disappearing with the demise of Twin Oaks Books.

FORWARD

It was in the early 1960's, perhaps even a bit earlier, that I first met Carson Whitlow. In those early years I was actively engaged in cattleya and cymbidium hybridizing at Stewart Orchids in San Gabriel. We had a very active cattleya hybridizing program in a full spectrum of types and colors. Carson Whitlow was a friend and customer, however, his extraordinary enthusiasm for breeding Blue Cattleyas and acquiring Blue Cattleya parental stock far exceeded my or the company's ability to concentrate on one particular color section of the cattleya alliance. Because he was not involved in commercial orchid growing per se an arrangement was worked out where he would acquire on his own the stud plants, make the hybrids and Stewart Orchids would grow them on with the right to merchandise. Over the years it proved to be quite equitable for both parties. Many a rare blue cultivar of a species was obtained by Carson who industriously searched the orchid world for new parental material often unknown and unavailable to anyone else. Not only did he obtain rare blue cultivars but his correspondence with many of the sources is an increasingly valuable historical file.

The breeding of blue cattleyas has been perennially difficult and often without reward. As the years passed, Carson pursued his blue breeding, the pods were harvested, seeds sown and crosses grown on. As they flowered he made his observations and in time wrote for publication of the results. Many of the famous early hybrids in the orchid world were remade in their blue strain; *Cattleya* Alcimeda Coerulea, *Laeliocattleya* Gaskel-Pumila, *C.* Suzanne Hye Coerulea, *C.* Purity Coerulea and *C.* Dupreana Coerulea. There were many more and of course many were entirely new hybrids.

The precise listing of his work does not serve a purpose in a forward. Some blue breeding had been done prior to Carson Whitlow's efforts. Perhaps the most notable was Sir Jeremiah Colman of England who worked from the early years of the century to the late 30's. Sir Jeremiah's work is still valuable however that by Carson Whitlow shall probably stand as the most notable in this cattleya color section ever done. I can wonder if it can ever be equaled or surpassed.

For various reasons a recording of Whitlows effort serves several purposes: it makes interesting reading, is of value to those who seek plants in this color section and to those who wish to continue the breeding of blue cattleyas and who need references and guide lines.

E. Hetherington
June 11, 1990

INTRODUCTION

There seems to be cycles in orchids, as there are in other things. Interest in one line of breeding or type changes over to another, then in twenty or thirty years swings back again. Over the last thirty years, several significant changes have occurred which have altered the directions in orchids, to some extent.

The one major change has come about through meristem tissue culture methods and mericloning. Through this technique, superior plants once available in limited numbers and high cost, become readily available at reasonable cost within a few years of their development. This has placed in the hands of ammeter hybridizers plants which they could never have expected to acquire before. In addition, new and superior culture media, especially for the Paphiopedilums, give greater germination and growth of seed. Thus, nearly everyone can now produce hybrid seedlings of superior parentage or their own mericlones.

Additionally, greater exploration of the jungle and recent availability of a number of Chinese species has expanded the available gene pool in a number of genera and led to new directions in breeding and superior remakes of older hybrids.

But, when I started in 1958, clones were reproduced by division of the plant, and superior plants were always in demand and at high prices. One had to learn patience in getting a collection together. For the blue Cattleyas, the clones were quite limited and hard to find. Many of them were located out of the country, and getting them into this country often posed major problems.

Most of the breeding I was involved with came about in association with the Fred A. Stewart, Inc. firm in San Gabriel, California, primarily through Ernest Hetherington. They housed and took care of my plants, they provided trading stock if needed, and they had a limited number of blue stud plants already to work with. I did the hybridizing and harvested the pod. They would take the pod, grow and offer the seedlings. I got to see the results of my efforts, and they at least made their expenses (I presume).

I have always been fairly open about the work I was doing with the blues and tried to pass on information and observations for others to learn or to challenge. Gordon Dillon, then editor of the American Orchid Society Bulletin, was encouraging in this and in 1966 my first article appeared in the Bulletin. Additional articles appeared in the Bulletin and Orchid Digest, some being published in both journals, as more information and knowledge was gained. The last of my articles on blue Cattleyas appeared in the Bulletin in 1976.

My major hybridizing work concluded in the fall of 1969. At that time, I left the California area and until the 1980's did not have the opportunity to again get set up and do much work with the blues. It is taking time to rebuild a collection which has deteriorated badly over the years and suffered a freezeout. However, it is so heartening to have divisions of the blues offered and provided to me by people who are interested in my work, have followed it, and have encouraged me to continue with it even further.

Of recent, there is renewed interest in the hybridizing of the blue Cattleyas. My calendar has been complicated by numerous speaking engagements which I gladly provide, if possible. However, not being in the "orchid business", I often must take vacation time in order to give a presentation. But, it is a "labor of love" which my wife fortunately understands.

In reviewing for my presentations, I found that much of the information provided twenty years ago is still very applicable. So, I decided to put the articles together in one manuscript for easy reference and to illustrate the historical development of them. Other authors have touched on blues as well, notably Leo Holquin and Ernest Hetherington*, and their articles and writings are well worth reviewing. A series of articles on blue breeding being done in Brazil has been proposed and I sincerely hope that it becomes a reality, for many fine blues have come from that country and the other South American countries as well.

The success that I have had in this breeding program has been accomplished only through the support of a number of fine people. Walter Barker, formerly of Santa Ana, California, was there when I was just starting and helped me get on my feet. Paul Brecht of Costa Mesa, California, was a good friend and gave me much encouragement. Ernest Hetherington of Arcadia, California, and the Fred A. Stewart concern, placed their faith in a young unproven hybridizer and allowed his work to be available to the world. The late Gordon Dillon made the passing of information and the development of what skills I have in writing possible by his encouragement. Both Eddie Waras and the late Waldemar Silva of Brazil were patient with me, diligently searched out the various blue species and got the divisions I was interested in - their letters are still cherished for the considerable background information they contain. Thanks really does not express the gratitude I feel toward you all. You did it, I just put it together.

Carson E. Whitlow
June, 1990

* Ernest's article, "Blue Cattleyas", in the American Orchid Society Bulletin, volume 54, number 5, May, 1985, pages 543-552, is highly recommended reading.

CURRENT ASPECTS OF BLUE CATTLEYA BREEDING

With the recent interest in blue Cattleyas, a number of commercial concerns have begun breeding this long-shelved line. Of course, one cannot overlook the basic reasons for its drop in popularity since Sir Jeremiah Coleman first worked with this color in the early part of the century.

The color itself is the primary reason for this line of breeding having slowed. Whereas along lavender lines, deep rich colors have been developed, in the blue line only strong suggestions of the color are apparent to most observers, and some fail to see even this. Its appearance in Cattleyas is extremely variable, showing strongly under certain conditions, while very weakly under others. Temperature is of primary concern. From numerous observations, the blue color reaches its greatest potential when plants are kept cooler during bud development and the early blooming stage. Relatively high light intensity does not seem to alter color, nor does off-season blooming.

The other major reason is the sterility barrier. For the most part, this is being overcome through the use of embryo culture.

Several break-throughs have occurred prior to this time. Nature has given us *Laeliocattleya elegans* 'Werkhauserii' and *Lc. schilleriana* 'coerulea'. Coleman hybridized *Cattleya* Portia coerulea, *C.* Ariel coerulea, *Lc.* Parysatis coerulea and *Brassolaeliocattleya* Victoria coerulea. In 1959, *Lc.* Blue Boy made its appearance and now *Lc.* Mariner and *Lc.* Poor Paul are beginning to bloom.

At present, *Lc.* Blue Boy and *C.* Ariel coerulea are figuring heavily in the breeding. They are being used principally with the larger Cattleyas. With each other, they make *Lc.* Blue Knight. In most cases, embryo cultures are giving seedlings in large quantities.

Laeliocattleya Parysatis coerulea has long been considered sterile, but several crosses with it as one parent are presently germinating or are out of flask.

Cattleya Portia coerulea is also making its entry. Variety 'Thielsts' is considered the darkest, yet most difficult to breed. Being comparable to *C.* Ariel coerulea, it will probably be used similarly.

Two recent hybrids on the order of *Lc. elegans* 'Werkhauserii' are *Lc.* Schilleriana, Werkhauserii strain, and *C.* Undine, semicoerulea strain. They are being used with the larger Cattleyas and in making *Lc.* Blue Boy-type hybrids. They give seed readily and several crosses are ready for reflasking.

Cattleya intermedia var. *amethystina* has been crossed with *C. warneri* var. *coerulea* with excellent germination. A pod is presently forming with it with *C. gaskelliana* 'Blue Dragon'. Both of these crosses are expected to be on the order of *C.* Undine. The future for this plant will principally be in the primary crosses and unusuals

Laelia anceps var. *veitchiana* is the parent for cooler-growing hybrids for growing out-of-doors in Southern California and similar climates. Presently, it has been crossed with *Lc.* Blue Boy and others with good germination.

The familiar blue hybrids, *C.* Portia coerulea, *C.* Ariel coerulea and *Lc.* Parysatis coerulea are scheduled for remake, using variety concolor or selected selfings of *C. bowringiana* var. *coerulescens.*

The blue forms of *C. gaskelliana, C. labiata, C. mossiae* and *C. warneri* are being used with most of the other species and hybrids and among themselves. Two very promising crosses, *C.* Intertexta and *C.* Mrs. Myra Peeters, are ready for reflasking.

Though *C. trianae* 'Blue Bird' is of questionable value as a breeder, it is being used. Second-generation hybrids with it in the background will probably be of greater value than their first-generation predecessors.

Laeliocattleya Jericho is another "sterile" blue being used. Where the blue strain of this hybrid came from is a good questions, but it will figure greatly in future blue breeding.

Cattleya walkeriana var. *coerulea* has a lovely blue coloring with a lemon-yellow disc on the lip. It is being used primarily for unusuals.

Divisions of *C. loddigesii* var. *azul*, *L. pumila* var. *coerulea* and a blue form of *C. deckeri* are still to small for breeding, but seedlings from them are certainly forthcoming.

Time? Ten - twenty years? Perhaps it would be best to summarize by saying blue Cattleya breeding is still in its infancy, much on the order of the other lines fifty years ago.

(American Orchid Society Bulletin, Vol. 35, No. 8, August, 1966, pp. 647-648.)

THE BLUE CATTLEYA AND LAELIA SPECIES

The following is an attempt to compile a complete list of the blue Cattleya and Laelia species, accompanied by various notes, for reference for those individuals interested in this color line. it includes varieties mentioned by previous authors and recent introductions. Some of these varieties are no longer in cultivation or their whereabouts are unknown or questionable. These are marked with an asterisk (*) in the listing.

Cattleya amethystaglossa 'Higgins Blue'
Cattleya amethystaglossa 'Blue Cast'
C. bicolor var. *coerulea**
C. bowringiana var. *coerulescens*
C. bowringiana var. *coerulea*
C. bowringiana var. *concolor*
C. bowringiana var. *violacea**
C. bowringiana var. *lilacina**
C. gaskelliana var. *coerulescens**
C. gaskelliana var. *coerulea**
C. gaskelliana 'Blue Dragon'
C. harrisoniana var. *coerulea**
C. harrisoniana var. *azul*
C. intermedia var. *amethystina*
C. intermedia var. *coerulea*
C. labiata var. *coerulea*
C. loddigesii var. *coerulea**
C. loddigesii var. *delicata**
C. maxima var. *coerulescens*
C. maxima var. Blue
C. mendelii var. *leucoglossa**
C. mendelii var. *coerulea**
C. mossiae var. *coelestris**
C. mossiae 'Sanson'*
C. mossiae 'Parcha'*
C. mossiae 'Reineckiana, Blue Lip'
C. schroederae var. *coerulea**
C. schroederae var. *lilacina**
C. trianae var. *coerulea*
C. trianae 'Blue Bird'
C. walkeriana var. *coerulea*
C. warneri var. *coerulea*
L. anceps var. *veitchiana*
L. autumnalis 'Blue'*
L. crispa var. *coerulea**
L. perrinii var. *coerulea**
L. pumila var. *coerulea*
L. pumila 'Gatton Park'*

L. purpurata var. Werkhauserii

Several bluish forms of *C. amethystoglossa* have appeared of late as a result of a selfing. They have blue-lilac spots and lip with off-white sepals.

Cattleya bowringiana has five blue forms. Of the first three, the clearest is var. *concolor*. It has no lavender in the flower. It is blight blue throughout with a darker bar in the lip. Variety coerulescens has been selfed, and some fine blue forms are appearing among the progeny.

Two forms of blue *C. gaskelliana* are suspected of being synonymous, and possibly a third. The two are var. *coerulea* and 'Blue Dragon'. The latter has off-white sepals with dark blue veins in the throat, yellow-orange eyes and a lavender bar overlaying the solid dark-blue lip. Its new growth takes on a pinkish color similar to that exhibited in var. *coerulescens* progeny, *C.* Ariel coerulea.

Cattleya harrisoniana var. *azul* has been described as blue lilac with darker coloring in the lip. Its growth shows blue-lavender spotting, so there is probably some definite signs of lavender in the flower.

Cattleya intermedia is one of the most widespread of the blue species, with several varieties having blue lips. The most common are listed. The sepals and petals are white to off-white.

Cattleya labiata var. *coerulea* is well known but not common in cultivation. There are about a dozen different clones, one of which will be discussed. It is a little difficult to grow. The flowers are off-white to light blue, with darker veining in the lip and gold throat and eyes.

Cattleya maxima has two synonymous blue clones. This plant was one of several wild collected plants imported from Ecuador by the late Bob Grinder. Upon blooming, it had a strong blue cast. It did not get a varietal name until it had been divided and pieces given to several persons. Thus the confusion. It varies in color from bluish lavender to lavender. It has been used as a parent with Lc. Blue Boy. Most of the seedlings show strong indications of lavender.

There are several blue clones of *C. mossiae*, and quite possibly some are synonymous. The variety 'Reineckiana, Blue Lip' (R.B.L., in general reference) has yellow eyes and throat with off-white sepals and blue-pink veins in the throat when grown warm, and fine, medium-blue-with-dark-blue veining when grown cool.

Cattleya trianae var. *coerulea* shows bluish tones but is washed-out. Variety 'Blue Bird' is the darkest but still exhibits a great deal of lavender. It is difficult to grow and its progeny show distinct signs of lavender.

Cattleya walkeriana var. *coerulea* is one of the most interesting of the blues. Its growth shows no coloring, but the bloom spike has tiny dots of dark blue-pink. When the flower opens, it is off-white and quickly changes to e fine blue with light lavender or pink undershading. It is nearly concolor, having only two or three small, dark veins in the lip. There is a lemon-yellow disc overlaid on the forelobe of the lip.

There are about six different clones of *C. warneri* var. *coerulea*. Generally speaking, sepals and petals are a fine medium blue, with a solid dark lip. It is one of the easiest to grow and one of the loveliest of flowers.

Laelia anceps var. *veitchiana* has strong suggestions of blue in the near-white sepals. The lip is the same color, but edged in a darker clear blue. During its early stages, the new growth shows a little bluish color.

Laelia autumnalis 'Blue' was listed in a Missouri Botanical Gardens publication a few years ago, but it has been misplaced in their collection or possibly lost.

Laelia crispa var. *coerulea* has been described as having off-white sepals and a fine, dark-blue lip. One small division is all that is known to exist, and it is not doing well.

Laelia perrinii var. *coerulea* is two different clones. One has been described as blue-lavender with darker lip. The other has off-white sepals and a blue lip. Neither are known to be in cultivation in this country.

There are three distinct clones of *L. pumila* var. *coerulea*. They are perhaps the darkest of the blues. Tepals are medium to dark blue with an even darker lip. *Laelia praestans* 'Gatton Park' may be included here. It was used as a parent of *Lc.* Parysatis coerulea and since disappeared.

Laelia purpurata var. Werkhauserii is the most well-known of the blue Laelias. There are numerous jungle-collected clones and several selfings. It has white sepals with a dark blue to blue-lavender lip.

Perhaps as time passes, more blue species will come to light or some of those "lost" will reappear. If the reader knows of others to add to this list, please do so.

(American Orchid Society Bulletin, Vol. 35, No. 10, October, 1966, pp. 834-835.)

BLUE HYBRIDS OF THE CATTLEYA GROUP

Perhaps the place to begin when discussing blue hybrids would be with the natural ones, of which there are two - both of Brazilian origin and having *Laelia purpurata*, no doubt variety Werkhauserii, as one parent.

The first, *Laeliocattleya elegans* 'Werkhauserii' (*L. purpurata* x *C. guttata*), came to these shores several years ago. Its sepals and petals are greenish white. The lip has a blue-lavender bar on the forelobe, which shades frosty blue further up the throat. It made its breeding debut crossed with *Cattleya* Ariel coerulea, to make *Lc.* Blue Boy.

Laeliocattleya schilleriana 'coerulea' (*L. purpurata* x *C. intermedia*) is the other natural hybrid. Its sepals are white with the forelobe of the lip being dark blue-lavender. This plant has been superseded by some superior forms of a fairly recent cross utilizing two fine blue varieties of the parents.

No one can overlook the groundwork done in producing the Gatton Park "tints" by Sir Jeremiah Coleman. Some of his original hybrids are still in cultivation. The most popular is *C.* Portia coerulea (*C. bowringiana* var. *violacea* x *C. labiata* var. *coerulea*). The color is light to medium blue with a darker lip. The lip has a dark lavender bar across it, as do most of the *C. bowringiana* hybrids. Size of the flower is around three inches. There are numerous varieties, some darker than others. In most cases this hybrid is difficult to breed, but it has and is being used for further hybrid work.

Another of Coleman's crosses, not as well distributed, is *C.* Ariel coerulea (*C. bowringiana* var. *lilacina* x *C. gaskelliana* var. *coerulescens*). The plant and flowers are about the same size as those of C. Portia coerulea. It blooms about the same time, but the flowers are generally darker. This hybrid is figuring greatly in today's breeding.

Laeliocattleya Parysatis coerulea (*C. bowringiana* var. *lilacina* x *L. praestans* [*pumila*] 'Gatton Park') has only been used for hybridizing in recent years. Its flowers are two- to two-and-a-half inches across, medium to dark blue with a dark, solid lip, again exhibiting the lavender bar. It blooms two or three times a year with three or four flowers per spike and Is rather easy to grow.

Brassolaeliocattleya Victoria coerulea (*C.* Portia coerulea x *Blc.* Antoinette) is rather interesting, as for its background. *Brassolaeliocattleya* Antoinette is *C.* Portia (coerulea ?) with *Bl.* Helen. The latter is *B. digbyana* x *L. tenebrosa*. The outcome in the blue form is very close akin to *C.* Portia coerulea in every way.

There were other hybrids of Coleman's which were in the blue field but seemed to have been passed by or have passed on. Among these were *C.* Alcimeda coerulea (*C. gaskelliana* var. *coerulescens* x *C. labiata* var. *coerulea*), *C.* Blanche (*C. labiata* var. *coerulea* x *C. maxima*), *C.* Chloringiana (*C. bowringiana* var. *lilacina* x *C.* Chloris), *C.* Princess Helen Victoria (*C.* Ariel coerulea x *C. maxima* var. *gigantea*), *Lc.* Lillian Gilliat (*Lc.* Ophir x *C.* Alcimeda coerulea), and *Lc.* Portia-pumila (*C.* Portia coerulea x *L. pumila*).

Blue forms of *Lc.* Jericho (*C.* Remy Cholet x *Lc.* Erica Sander) have also appeared. This hybrid is a big question mark in my book. No information seems to be available on it. It is a well-shaped, large flowered, fine blue. It is somewhat difficult to breed, but some success has been attained.

Laeliocattleya Summer Haze (*C.* Porcia 'Cannizaro' x *C. warneri* var. *coerulea*) was an unsuccessful attempt at blue, but some off-colors appeared, reminiscent of the blue in *C. warneri* var. *coerulea*.

Laeliocattleya Blue Boy (*C.* Ariel coerulea 'Bodnant's' x *Lc. elegans* Werkhauserii') was perhaps the biggest breakthrough in recent times. The flowers are from three to five inches across with dark lips, most with the lavender bar, and have fine blue coloration throughout. This is one of today's principal breeders. They are very fertile and seedlings are strong growers.

Laeliocattleya Eximea (*L. purpurata* 'Werkhauserii' x *C. warneri* var. *coerulea*) and *C.* Olivia (*C. trianae* 'Blue Bird' x *C. intermedia* var. *amethystina*) are two crosses I have seen but a few of, and none have been very blue. Their pedigrees are such that at least a few blue forms would be expected.

Several crosses of *Lc.* Schilleriana have appeared of late. It has been interesting to note the really high percentage of lavender ones. Other *L. purpurata* 'Werkhauserii' crosses, i.e., *Lc.* Mariner (x *C.* Ariel coerulea) and *Lc.* Poor Paul (x *C.* Portia coerulea), are also giving lavenders along with blues. It leads one to speculate whether the best *L. purpurata* for breeding this color has yet been found.

Cattleya Undine (*C. mossiae* 'Reineckiana, Blue Lip' x *C. intermedia* var. *coerulea*) has white to very light blue sepals. The lip is veined a delicate clear blue. No lavender is apparent in most cases. The flowers are three to five inches across, two or three to a spike. They are proving very fertile and have been used for several crosses.

The cross of *Epidendrum mariae* x *Lc.* Blue Boy is a very interesting one. The idea behind it was probably to enhance the blue by using the green of the Epidendrum parent. The outcome has been flowers which are about three inches across with a Cattleya-type lip. They vary a great deal in petal size, shape, and lip coloration. Color varies from dark lavender to light rose with green undershading, and some blues.

Though not all blue hybrids are included in this article, the greatest majority of the blooming ones have been. Many more are on their way, in flask, flat, or pot. We can look forward to these new generations with high hopes for finer, clearer, darker blues.

(American Orchid Society Bulletin, Vol. 35, No. 11, November, 1966, pp. 915-916.)

NOTES ON BREEDING *LAELIOCATTLEYA* PARYSATIS COERULEA (I)

Laeliocattleya Parysatis coerulea is the hybrid of *Cattleya bowringiana* var. *lilacina* with *Laelia praestans* (*pumila*) 'Gatton Park' registered by Sir Jeremiah Coleman in 1918. For many years this petite, easily grown and flowered, blue hybrid has been considered sterile. To the contrary, it is producing progeny in abundance.

Our plants of *Lc.* Parysatis coerulea are grown near the glass on the south side of the house and bloom two to three times a year. Because of the short time interval between pollenation and embryo culturing and since the flowers are readily available throughout the year, it has been used as a pod parent exclusively. It is pollenated within the first three to four days of opening. The seed pods are removed and embryo cultured four months from the date of pollenation or when the column starts yellowing. From our experience, a pod that forms and stays on the plant three and a half to four months will produce some seedlings. A four bulb plant can carry one pod easily. We have had eight on a plant of an equal number of bulbs. Seed pods do not hinder the next flowering, except when they are initiated in the fall.

The first crosses made with this hybrid were with *C. mossiae* 'Reineckiana, Blue Lip' and *C. gaskelliana* 'Blue Dragon'. The yield was very low. The succeeding crosses have been hybrids with *Lc.* Blue Boy, *Lc.* Schilleriana 'Werkhauserii', and *C. warneri* var. *coerulea* in addition to remakes of the first two. The crosses with *C. mossiae* and *C. warneri* are both giving low yield while the others are giving numerous seedlings which exhibit vigorous growing characteristics and readily adjust once out of flask. They can be grown under relatively high light intensity, also.

We expect *Lc.* Parysatis coerulea to breed much on the order of *C.* Ariel coerulea and *C.* Portia coerulea but imparting smaller size and lip. The flatness and deep blue of the laelia parent is expected to predominate.

(The Orchid Digest, Vol. 31, No. 4, April, 1967, p. 119.)

THE LARGE BLUE CATTLEYA HYBRIDS

Most of the present-day blue Cattleya hybrids have *Cattleya bowringiana* in their pedigrees; therefore, most of the flowers are small to medium size. With the increasing interest in this color, breeders have sought out the more desirable of the large blue species. This article deals more in detail with these plants and their use in breeding.

Cattleya warneri var. *coerulea* has a very stable color and is essentially the same from season to season. It is a clear medium blue with a darker solid lip. No lavender influence is apparent in the new growth. It breeds readily and is a robust, prolific grower.

The most well-known of the blue species is *Cattleya labiata* var. *coerulea*, of which there are numerous clones. These vary in color and shape. The one in this writer's collection has a lovely deep blue midrib and a lavender disc in the lip. The sepals are white or shade toward light blue. It has not been subjected to high light intensity to see if any color IS apparent in the growth, but in its progeny (x *C.* Ariel coerulea) only a few show lavender influence.

In general, *Cattleya mossiae* 'Reineckiana, Blue Lip' is of fine form for the species. It shows no lavender in the growth, though it does lack color stability. It will bloom a lovely medium blue with darker veining in the lip one year, and be nearly white with little veining in the lip the next. It is very easy to grow, as are its seedlings.

Cattleya gaskelliana 'Blue Dragon' generally blooms with white sepals and a dark midrib in the lavender-disced lip. The forelobe is a blue to blue-lavender. This plant has bloomed with blue sepals, so again we demonstrate the lack of stability. It is a very good, prolific grower. The new growths show definite signs of lavender.

Cattleya trianae 'Blue Bird' has definite lavender coloration of the growths and has been breeding lavender. It is expected to produce some blues when combined with the others. The flowers are well shaped, blue-lavender with a darker lip. This color varies from year to year. This is a difficult plant to grow and the trait is apparent in a number of its progeny.

Several hybrids have been made within this group recently. Among them are *C.* Alcimeda *(C. gaskelliana* 'Blue Dragon' x *C. labiata* var. *coerulea*), *C.* Bobby Howarth (*C. gaskelliana* 'Blue Dragon' x *C. trianae* 'Blue Bird'), *C.* Intertexta (*C. mossiae* 'Reineckiana, Blue Lip' x *C. warneri* var. *coerulea*), *C.* Mrs. Myra Peeters (*C. gaskelliana* 'Blue Dragon' x *C. warneri* var. *coerulea*) and *C.* Veriflora (*C. labiata* var. *coerulea* x *C. trianae* 'Blue Bird'). Most of these are presently in the early stages of growth.

If the theory on the lack of color in the growth is proven valid, i.e., that the better-colored blues of the cross will come from those seedlings exhibiting the least amount of color in the growth when grown under high light intensity, preliminary segregation of seedlings can save considerable space for the breeder and give him a better chance of obtaining the color he desires. This would be of particular advantage when using *C. trianae* 'Blue Bird' as a parent.

As for each parent, the hopes are as follows: *C. warneri* will have a stabilizing effect on the color. Clarity of color from *C. warneri* and *C. mossiae* will help remove the lavender disc which appears in the lip of the others. The dark blue midrib in the lip of *C. gaskelliana* and *C. labiata* will tend to darken the lip color. *Cattleya trianae* will give finer form and solid lip.

We are looking forward to these primary hybrids with high hopes, but even more so to being able to breed secondaries, where even greater recombinations are possible.

(American Orchid Society Bulletin, Vol.36, No.1, January, 1967, pp. 23-24. The Orchid Digest, Vol.33, No.8, October, 1969, pp.261-262.)

THOUGHTS ON *LAELIOCATTLEYA* BLUE BOY TYPE HYBRIDIZING

Laeliocattleya Blue Boy was registered in 1960 by B. O. Bracey. It was the first truly successful blue Cattleya hybrid since the early Coleman crosses and has set guidelines for breeding medium sized blues. The blooms, in general, are of medium blue color with the lip darker, crossed by a lavender bar. In contrast to other blues, these plants are quite fertile.

One of the parents is the natural hybrid *Lc. elegans* 'Werkhauserii' (*Laelia purpurata* x *Cattleya guttata*). It is of typical form in size and shape, but has off-white sepals and petals. The lip exhibits a dark lavender disc and the new growths show a definite lavender influence. The veining of the forelobe of the lip is a dark, misty blue color. This is the key parent in this breeding. The sepals shade toward muddy green or yellow, which seems to enhance the blue color in the lip and the color of the entire flower of the progeny. Of the hybrids now in existence, two can be considered as somewhat similar. The first is the blue strain of *Lc.* Schilleriana. In this hybrid the sepals are white to off-white, shaded toward blue. The lip does not have the large disc, but some lavender is apparent. The veining is relatively uniform blue to blue-lavender. The growth exhibits some color. *Cattleya intermedia* replaces the *C. guttata* parent which results in poorer shape and lack of enhancing greenish shade.

The second hybrid not only substitutes *C. intermedia* for *C. guttata*, but replaces *L. purpurata* with *C. mossiae*. The result in this blue strain of *C.* Undine is a shape similar to *Lc.* Schilleriana, with a clearer, lighter veined lip. The sepals are white to light blue and the growths show no lavender influence.

The other parent of *Lc.* Blue Boy is *C.* Ariel coerulea 'Bodnant's'. This discussion will center on three different clones, including this variety, which are fairly uniform in color, size and shape. The sepals and petals are medium blue. The lip is darker, exhibiting a lavender tear common in all early *C. bowringiana* hybrids. The parentage is *C. bowringiana* var. *lilacina* with *C. gaskelliana* var. *coerulescens*. The shape is very similar to *C.* Portia. When grown under high light intensity, some lavender is apparent in the growth.

Three hybrids are similar here, two particularly. The first is *C.* Portia coerulea. There are numerous clones of this hybrid and they vary considerably, principally in color. Color varies from medium blue to blue-lavender. In breeding, the darker clones are recommended. *Cattleya labiata* var. *coerulea* is one parent, with variety *violacea* of *C. bowringiana* as the other.

The second hybrid is so close to *C.* Portia coerulea that little distinction will be made between them. This is the hybrid *Brassolaeliocattleya* Victoria coerulea which has *C.* Portia coerulea as one parent and a *C.* Portia hybrid (*Blc.* Antoinette) as the other. The result is literally a *C.* Portia coerulea of medium blue color.

In the third hybrid the same *C. bowringiana* was used as when making *C.* Ariel coerulea. The other parent was *Laelia praestans* (*pumila*)'Gatton Park'. The resulting hybrid is named *Lc.* Parysatis coerulea. The *L. pumila* var. *coerulea* in this writer's collection carries considerable

green in the flower. If variety 'Gatton Park' had a similar characteristic, it is well worth noting. This hybrid has more rounded petals than *C.* Portia coerulea, is smaller in size, but is one of the darkest of the blues. The bar of lavender is present in the nearly solid, dark lip.

If we use *Lc. elegans* 'Werkhauserii' as one parent with any of the hybrids similar to *C.* Ariel coerulea, nearly identical results to *Lc.* Blue Boy can be expected except with *Lc.* Parysatis coerulea, where flower size and lip will be reduced and color darkened. When using *Lc.* Schilleriana, the sepal color can be expected to be considerably lightened. *Cattleya* Undine, when used, will tend to clarify but lighten the color somewhat, the lip particularly. In the latter two cases shape can be expected to be poorer. All of the hybrids can be expected to have the lavender bar in the lip.

(American Orchid Society Bulletin, Vol. 36,No. 2, February, 1967, pp. 99-100. Orchid Digest, Vol. 33, No. 8, October, 1969, p. 261.)

FROM THE BEGINNING - BLUE CATTLEYAS

When one becomes interested in the blue Cattleyas, the lack of written and plant material becomes quite apparent. Though the first blue breeding was done at the turn of the century, it has not developed much past that point. Therefore, both the layman and breeder must start, literally, from the beginning.

The blue color in Cattleyas is not one which remains constant. The same clone will vary considerably from year to year, even within areas, from near lavender to near blue. This color is a shade of lavender, but quite distinct. Some color will usually show in the new growth of lavender-flowered plants, while in those blues lacking any lavender area, no color is apparent. Trying to code the color would be very difficult and colored film does not readily distinguish this shade.

I. The Influence of The Species

What does one consider a blue Cattleya or Laelia? Must it have blue in all its segments? Generally, a flower having blue sepals or a blue lip is included with those being blue throughout. Occasionally, there may be little, if any, blue color apparent, except in combination with an underlying color. These unique colors signify the presence of the blue color in the flower. (The case concerned here is when blue-veining overlays orange but does not extend past the orange area. An unusual maroon occurs from this combination.)

The blue Laelias make up one group which is here included under the term "blue Cattleyas" and provide perhaps the darkest of this color section.

The white-tepaled, dark blue-lipped *Laelia purpurata* var. *Werkhauserii* was first discovered in 1902. Numerous clones are now cultivated. Selfings have also increased the population. They are graded by color, the best being No. 1, next No. 2, and last, those having no designation. Some have received distinct form or subvariety titles. Two of these, 'Divine' and *superba*, vie for the distinction of being the finest. Both have very dark blue-veined lips. The former has the better shape, but lacks the fullness of the lip of the latter.

The solitary flower of *L. pumila* is even more striking when blue, whether it is the blue-tepaled form, "Orchidglade," or the white, occasionally blushed blue-tepaled form, "Werkhauserii." Both have solid dark blue lips. Though not common, it is easily grown.

The white with solid blue lip of *L. perrinii* var. *coerulea* 'Leonildo Regado' offers a challenge to the breeder. What to do with it? It is not easily grown and, typical of the species, lacks a good shape. It is rare in cultivation, especially in this country.

Laelia anceps var. *veitchiana* has a lovely blue-lavender lip. The sepals are white, occasionally blushed with blue. It is easily grown and available at reasonable cost, as are the selfed seedlings. For any collection, it is a worthy addition.

The main emphasis is of course on the Cattleyas. This group is continually coming up with newly discovered blue varieties and occasionally a blue variety in a species previously lacking one. Such is the case for *C. percivaliana* 'Ondina'. It was first collected in 1962. The description given here is of a single flower which opened this February, a year after he two-bulbed division was received. The eye markings are gold and extend down into the forelobe of the lip. The veining is a medium dark blue which is maroon where it overlays the gold. Though the sepals are only blushed, this trait is often a sign of instability. (By being unstable or lacking stability is meant that the sepal color is white or blushed when the plants are grown warm but is usually a medium blue when grown cool.) After it has become stronger and bloomed a few more times, a more complete analysis can be made.

Cattleya warscewiczii (syn. *C. gigas*) 'Helena de Ospina' is another of the recent discoveries. Here, the sepals are white. The full lip is veined a medium dark blue. The disc is lavender. Its possibilities in breeding are numerous.

Cattleya mossiae has many blue varieties. The one most common in breeding circles is variety 'Reineckiana, Blue Lip'(commonly shortened to 'R.B.L.'), which is also know as 'Blue' and 'McPeak's'. The lip markings are very similar to those of *C. percivaliana* 'Ondina', but the lip is much fuller. Tepal coloration also lacks stability. When the sepals are well-colored, they are a fine, clear medium blue. The growths show no evidence of lavender.

There are many clones referred to as *C. labiata* var. *coerulea*.

Some have blue sepals, stable or otherwise, while others are white tepaled. The lip is veined a medium dark blue. Well known as one of the parents of *C.* Portia coerulea, it is not widely cultivated in this country.

Perhaps the easiest to grow and bloom of the blue Cattleyas is *C. warneri* var. *coerulea*. The sepal coloration is very stable medium blue. The lip is nearly solid and of fairly dark blue. No lavender is apparent in the flower or growth. There are numerous selfed seedlings of this plant in Brazil, but the variety is not well known here.

Cattleya gaskelliana 'Blue Dragon' has unstable sepal coloration, also. It has bloomed with blue sepals but usually they are white. The lip is a medium dark blue having a lavender disc in the throat. The midrib of the lip is a darker blue. The few plants are widely dispersed, with a predominance of them on the West Coast.

The shape of *C. trianae* 'Blue Bird' is fine, the sepals are a lovely medium blue, but the lip is lavender. Variety azul has white sepals with a medium dark blue lip and a lavender disc in the throat. Though the former variety has received considerable publicity, both are fairly rare in cultivation.

Some of the bifoliates have blue coloration, also. *Cattleya intermedia* var. *amethystina* and var. *coerulea* are the most common of this group. The white tepaled flowers have the forelobe of the lips colored a medium dark blue. They are easily grown and inexpensive.

Cattleya bowringiana has several blue or bluish varieties. Variety concolor is a pale medium blue throughout. Selected selfings of the bluish clones have medium blue color with a disc in the throat of dark blue-lavender.

A few blue *C. amethystoglossa* varieties resulting from a selfing have blue forelobes and pin dots on the sepals. The disc area is lavender. The basic sepal color is off-white. Not well-known, it is a good grower but is very susceptible to smog and similar conditions which cause the flowers to drop before opening.

The *coerulescens* varieties of *C. schilleriana* are also a result of a selfing. The sepals are greenish brown spotted with maroon. The lip is veined medium dark blue. There are about three plants of this variety in this country.

Cattleya walkeriana var. *coerulea* and *Cattleya nobilior* var. *coerulea* have lovely medium blue sepals and lips. The latter has a lemon-yellow disc on the lip. Both varieties are rare. Problems of setting blooms are overcome by keeping the plants fairly dry after fall growth has matured. Watering is resumed after the spring growth has begun.

One natural hybrid of importance should be mentioned. This is *Laeliocattleya elegans* 'Werkhauserii', a cross of *L. purpurata* (probably var. *Werkhauserii*) and *C. Ieopoldii* (*guttata*). The sepals are an off-white shaded toward muddy green. The forelobe is veined a fairly dark blue which diffuses into a frosty blue color. The throat is disked with lavender.

Before continuing, an important fact should be noted. In general, blues have a strong tendency to be sterile, usually carrying the pod only a short time, or yielding very little, if any, viable seed when the pod is able to mature. This trait may, in part, explain why little has been done in this line. The current practice of embryo culturing, especially all pods of the blue hybrids, has made it possible to obtain a considerable amount of viable "seed", and thus many seedlings.

II. A History Of Blue Cattleya Hybridizing

The first artificial blue hybrids were made by Sir Jeremiah Coleman. Though known mostly for his primary hybrids, he did produce a third generation blue, *Brassolaeliocattleya* Victoria coerulea (*C.* Portia coerulea x *Blc.* Antoinette). The most popular of his hybrids is *C.* Portia coerulea (*C. bowringiana* var. *violacea* x *C. labiata* var. *coerulea*), of which there are numerous clones. Color is usually a medium blue with a darker lip crossed by a lavender disc.

Cattleya Ariel coerulea (*C. bowringiana* var. *lilacina* x *C. gaskelliana* var. *coerulescens*) has proven to be the most important of Coleman's hybrids. Color is similar to *C.* Portia coerulea, as is shape, though generally a little better. There are only a few clones of this hybrid in existence, and they are well distributed.

The last of Coleman's hybrids to be discussed is *Lc.* Parysatis coerulea (*C. bowringiana* var. *lilacina* x *L. praestans* [*pumila*]'Gatton Park'). The color is a medium blue, darker than average. The lip is a dark blue-lavender with a lavender disc. It is known to be widely distributed, but fairly rare in collections.

Though Coleman's work took place in the first quarter or so of this century, little had been done thereafter until a hybrid of *Lc. elegans* 'Werkhauserii' and *C.* Ariel coerulea 'Bodnant's' made its appearance in 1959. It was registered by B. O. Bracey as *Lc.* Blue Boy and has brought a great deal of publicity and popularity to the blues. The color is darker and clearer, and the shape better than the *C.* Ariel coerulea parent.

Since then, several hybrids have been made, among them two primaries. *Cattleya* Undine (*C. mossiae* 'Reineckiana, Blue Lip' x *C. intermedia* var. *coerulea*) was bred in hopes of getting more blue into the sepals. The results have been sepals which are white or off-white shaded toward blue. The lip is veined a medium dark blue.

There have been several strains of *Lc.* Schilleriana (*L. purpurata* x *C. intermedia*) made, using blue parents. A couple have been quite successful. In these, the flowers are open, with white sepals and blue veined lip. The blue varies in shade and most have a lavender disc in the throat.

Laelia purpurata var. *Werkhauserii* has been popular as a parent. It has been used with *C.* Ariel coerulea to give *Lc.* Mariner, with *C.* Portia coerulea to yield *Lc.* Poor Paul. In the former hybrid, the results are much like *Lc.* Blue Boy, but are not colored as nicely. Tepal coloration varies from light to medium blue, and occasionally a lavender will appear. The latter hybrid has given lavenders on the order of *Lc.* Blue Boy in size and shape, but those having larger flowers have sepals off-white to light blue and a darker blue veined lip very reminiscent of *L. purpurata*.

The seedlings of *Lc.* Blue Boy x self have been giving results similar in color to the parents. Shape varies considerably, while size is about the same.

The hybrid *Epilaeliocattleya* Emerald Bay (*Epidendrum mariae* x *Lc.* Blue Boy) is one of interest. The Epidendrum parent generally is somewhat neutral from the lavender standpoint but has the characteristics of adding green to the sepals and throat and washing out color throughout. The progeny of this cross vary considerably in size, shape and color. Dark lavenders, pastels, and blues are present. The blues normally turn lavender after the flowers have been open several days.

Currently, several new hybrids have appeared and additions are being made every few months. These seedlings have, in general, better promise than those of the immediate "post-Blue Boy days." Most are limited to *Lc.* Blue Boy parents on one side.

The future is bright. With the breeding material becoming less scarce, more and more breeding is being done. Many of the species have been selfed. The six possible combinations of the "big four," the blue varieties of *C. gaskelliana*, *C. labiata*, *C. mossiae*, and *C. warneri*, have all been made and are in various stages of growth. The many variables of size, shape, sepal color, and lip markings, will give a wide range of choice in this color breeding. It is but a few years until they will be appearing.

To discuss these forthcoming hybrids, which are upward of one hundred, would entail more space than afforded here. But, a few comments based on the results of the near past may be apropos. *Cattleya* Ariel coerulea hybrids seem to have the greatest potential for shape, color,

vigor, and uniform good quality, although size will be about the size of this parent. The *Lc.* Blue Boy hybrids are also worthy of mention because of the finer color of this parent, but the progeny have a much wider variation in the quality of the flower. *Cattleya mossiae* 'Reineckiana, Blue Lip' has good clear color and will help increase size and improve shape slightly.

A few short notes on the blue color are worth passing on. It has been noted that the greenish color of *Lc. elegans* 'Werkhauserii' had an enhancing effect on the blue in *Lc.* Blue Boy and the Epidendrum parent had in *Elc.* Emerald Bay. Lemon-yellow also enhances in another way, turning the blue to blue-black. Orange or gold tones combine with blue to make maroon. No doubt these are examples of copigmentation. In breeding, however, it must be remembered that the blue color is very recessive - with the possible exception of some of the Laelia blue.

As noted earlier, environment can have a tremendous effect on the blue color. When the plants are grown on the warm side, the flowers are generally washed out and nearly lavender. Grown cool, the blue reaches its potential! Also, shading as the buds emerge helps the color to develop.

In summary, we have just scratched the surface in this line of breeding. More plant material is becoming available to add its characteristics and variations to the hybrids. More hybrids having a high probability for giving blue are, and will be, offered. Improvement in color will come about through progressive breeding and careful analysis of the results. Size and shape, although secondary at this point, will develop within the specific lines desired by the breeder.

(The Orchid Digest, Vol., 32, No. 4, May, 1968, pp. 102-106.)

AN ADVENTURE IN BLUE

Most of the concern with blue cattleyas and laelias centers around the production of the large blue hybrids, or at least attempts at attaining them. Size has been a limiting factor due to the parental stock used, primarily *Cattleya* Ariel coerulea, *C.* Portia coerulea and *Laeliocattleya* Blue Boy. But, small size should not be a factor to overlook, nor should "unusual" character, for from these can come some "real jewels." In the blue laelias and cattleyas we have several of the smaller species which can be developed into very exciting hybrids, primarily among themselves, with many variations of shape and coloration, but still retaining the blue areas. Of this group, there are about six which come to mind that seem worthy of further development. These are the blue varieties of *C. amethystoglossa, C. schilleriana, C. nobilior*, *Laelia anceps*, *L. pumila*, and of course, *C. bowringiana*.

Cattleya amethystoglossa is one of my favorite blues. Its blue polka dots and forelobe of the lip form a lovely contrast to its off-white sepals. The lavender bar coloring in the lip does not really mar its appearance. If only it didn't "blast" so readily. Breeding usually must be done utilizing it as the pollen bearer.

Of the laelias, *L. pumila* has no comparison, in my way of thinking. Here, one specific clone is concerned, the variety *coerulea* "Werkhauserii." Every fall, the white-tepaled, dark blue, solid lip flower is eagerly awaited. Each fall it drops its pod of the selfing, or anything else for that matter, and smog has taken its toll on the flower. But, the pollen is usually good so some breeding can be done.

Cattleya schilleriana var. *coerulescens* is another intriguing subject. The blue veining of the lip offers us a good contrast to the greenish bronze sepals and maroon pin dots. The potential here is most interesting. Unfortunately, my only photograph is from a friend and the plant has yet to bloom for me.

Cattleya nobilior var. *coerulea* is another lovely blue. The lack of darker blue color on the lip is a feature. It is a good breeder, excepting when selfed, and is touchy about repotting. It offers some interesting off-shoots to follow in breeding.

Laelia anceps var. *veitchiana*, though lacking somewhat the depth of color found in other laelias, can be used with success. The lovely white sepals and blue lip are certainly worthy of any collection. The tall spike, rambling habit, and star shape should not be drawbacks and its fertility certainly isn't.

The place of *Cattleya bowringiana* in this group for breeding is established with its use with *L. pumila* to make *Lc.* Parysatis. But involving it with the others can prove interesting, also.

This group can be very rewarding since they grow rapidly and mature early, especially the laelias, as do their progeny. Success, however, is not always that simple. Mine has been limited to only three crosses out of nearly six times that many attempts.

The first successful cross was between *Laelia anceps* var. *veitchiana* and *L. pumila* var. *coerulea* "Werkhauserii." It has been previously registered as *L.* Amoena, but searching through the literature gives no information on the outcome of it in regard to size, shape, veining, etc. Currently, the expectation is for white sepals and blue lip as the primary consideration. As for size, three inches is probable. By applying the geometric mean to the number of flowers and the size of the spike, two flowers per six inch spike is determined. The flower is expected to be more round than Laelia anceps, with the pseudobulbs spaced more closely, and to have good substance and texture. The yellow in the throat being different in the two parents, the presence or absence of veining will make for interesting genetic observations. Personally, this cross had high priority as a "natural," and I am very enthused about it. It should be very lovely and may prove useful for further breeding.

The second success was the cross *Laelia anceps* var. *veitchiana* x *Cattleya nobilior* var. *coerulea*. Expectations here are really not firm. Three to five star shaped, three and a half inch flowers on a twelve-inch spike is a fair guess, with spacing between pseudobulbs rather wide. Tepal color should be rather blue unless *Laelia anceps* suppresses it. Lip color should be a good blue, with veining in the throat probable. The yellow color in the throat is again questionable. The shape of the lip should prove to be an interesting aspect as to which parent it will favor most.

The third hybrid was a remake of *Lc.* Parysatis using *Cattleya bowringiana* 'alpha' as the pod bearer, with *Laelia pumila* var. *coerulea* 'Werkhauserii' giving the pollen. Only one clone of *Lc.* Parysatis coerulea is in existence to my knowledge. It has lovely blue-lavender sepals and darker lip. The flower has rounded petals, tubular lip, and is fairly flat. Size is two and a half to three inches. Flowering occurs both spring and fall. From this crossing much the same is expected, only with more blue coloring in the lip, and slightly lighter sepals. This strain's use in further breeding will more than likely depend on the outcome of crosses which have already been made using the aforementioned *Lc.* Parysatis coerulea.

So, we are off on the start of an adventure which can easily lead to more and more fascinating "unusual" jewels in the "world of blues" taking shape.

(The Orchid Digest, Vol. 33, No. 10, December, 1969, p. 317.)

NOTES ON BREEDING *LAELIOCATTLEYA* PARYSATIS COERULEA (II)

In a previous short article (1), several notions on the breeding of *Lc.* Parysatis coerulea were presented, including the successful crosses which had been made at that time. One of each of three of these hybrids has bloomed, having as the other parents *Lc.* Blue Boy, *Cattleya mossiae* 'Reineckiana, Blue Lip', and *Lc.* Schilleriana 'Werkhauserii'. The other two hybrids mentioned in the article, with *C. gaskelliana* 'Blue Dragon' and *C. warneri* var. *coerulea*, should bloom within a year. All have *Lc.* Parysatis coerulea as the pod bearer.

The use of *Lc.* Blue Boy as a parent has given, in general, seedlings of considerable variation in shape. The first seedling of the cross with *Lc.* Parysatis coerulea had an open shape, narrow, slightly curled sepals, and a somewhat shortened lip. The sepal color is light blue with the lavender barred lip a solid blue-lavender. The hybrid was made on November 20, 1964, embryo cultured March 30, 1965, and bloomed October 16, 1968.

Cattleya mossiae 'R.B.L.' is a proven parent, giving blues with *C. intermedia* var. *amethystina* (*C.* Undine), *C.* Portia coerulea (*C.* Big Ben) and *Lc.* Blue Boy. The first seedling with *Lc.* Parysatis coerulea has very good shape, is similar in size to *C.* Portia, and is flat. The lip is very reminiscent of *Lc.* Parysatis coerulea, being slightly larger, however, and exhibiting the "slit" in the center. The blue color is very apparent but diluted with lavender. This hybrid was made on June 13,1964, embryo cultured November 1,1964, and bloomed November 9, 1968.

One cannot expect much from *Lc.* Schilleriana in improving the shape, and with the Werkhauserii' strain, the blue lip leaves something to be desired, colorwise. Its use with *Lc.* Parysatis coerulea was what can be called "experimental," and nothing of real value is expected to come from it. Surprisingly, the most outstanding characteristic in the first seedling is the color of the lip. It is a fine blue, tinted only slightly with lavender, far better than either parent, and lacks the predominant lavender bar usually appearing in this type of breeding. Coloring on the wings of the column, common to both parents, is a very fine blue. The sepals are curled and pale blue. The lip is very similar to the *Lc.* Parysatis coerulea parent, but definitely showing the *Laelia purpurata* influence (from *Lc.* Schilleriana). The size is that of the *Lc.* Parysatis coerulea. The cross was made May 15, 1965, embryo cultured September 23, 1965, and bloomed May 10, 1969.

'We expect *Lc.* Parysatis coerulea to breed much on the order of *C.* Ariel coerulea and *C.* Portia coerulea but imparting smaller size and lip. The flatness and deep blue of the laelia parent is expected to predominate."(1) This is the summary previously forwarded. Apparently, some modification of this needs to be made. Considering the parents of *Lc.* Parysatis coerulea, the *C. bowringiana* used, var. *lilacina*, is the same as for *C.* Ariel coerulea, and *C.* Ariel coerulea is considered one of our finest blue breeders. Progeny using it as a parent have good blue color, no matter which of the *C.* Ariel coerulea parents they favor. This fact does not hold true for *C.* Portia coerulea which has a different *C. bowringiana* (var. *violacea*) parent (2).

The other parent, *L. praestans* (*pumila*)'Gatton Park', seems to be of prime concern, then. Apparently, it is of the *L. pumila* var. *coerulea* "Orchidglade" type rather than the "Werkhauserii" type, where the former has some lavender color present while the latter is very free of it.

The shape in two of the crosses seems to indicate that there is considerably more variability in the hybrids than can be expected from *C.* Ariel coerulea, especially when using other labiate cattleyas.

Although still very early to make any substantial conclusions, it appears that there will be some lavender shades among the progeny. Size and lip characteristics will favor *Lc.* Parysatis coerulea strongly, but flatness is not necessarily imparted. For vigor, there appears to be a strong tendency to grow well or poorly, with the gap between the two groups widening rapidly.

It is not the intent here to make any concrete statements regarding the use of *Lc.* Parysatis coerulea as a breeder and predicting the results "to a T," with only the three plants having bloomed. It is, however, the intent to keep information flowing. As large blocks of seedlings, using these parents in various combinations, come into bloom, a more comprehensive study of each parent can be made, thereby enabling the hybridizer to predict the outcome of a cross with more certainty. Due to the limited parental stock available, usually one variety per species, the opportunity to document a complete color line is rather unique and can be of great value to those who follow.

References:

(1) Whitlow, Carson E. Notes on Breeding *Laeliocattleya* Parysatis coerulea. The Orchid Digest, 31:119. 1967

(2) . From the Beginning-Blue Cattleyas. The Orchid Digest, 32:102-106. 1968

(The Orchid Digest, Vol. 33, No. 10, December, 1969, pp. 317-318.)

STABILIZATION AND ENHANCEMENT OF BLUE COLOR IN CATTLEYAS

In blue cattleyas there is observed a phenomenon defined as instability. This is the blooming of a blue-tepaled form lacking or nearly lacking any blue coloration in the sepals. The appearance or non-appearance of the blue is sporadic from year to year. In its strict sense, therefore, stability is when the blue color reaches its potential whenever the plant is in bloom, with only minor differences relative to the environment. Stability, however, is also applied in breeding to mean having sepal coloration every year, though ignoring the fluctuation within it. We are here concerned with stability in the strict sense.

It is better to approach this discussion by separating these unstable forms into white and lavender sorts. Most of the hybrids fall into the lavender sorts, while most of the species fall into the white sorts. The white sorts are blue-tepaled under near-perfect conditions and have a good medium-blue color. The lip is a darker blue. There is more coloring on the lip under these conditions, also. The lavender sorts, under near-perfect conditions, have a slightly darker blue color than the white sorts and the lip coloring is affected less. Lavender is barely apparent in the flower.

It is reported that the species in their own environments have flowers which are much bluer than when grown in greenhouses. Further study of the plants has shown that when grown under cooler conditions than normal, more blue color develops.

The workings of the blue color seem to be determined in part by temperature. Where the temperature is above a critical point, little color is produced in the white sorts. In the lavender sorts, the blue color is apparently channeled into the production of lavender. Because of these factors, stabilization may be difficult to attain. Holding just a small bit of lavender in the hybrids may help. Selection of progeny that are of a good shade of blue, even when grown warm, may be an approach. Polyploidy may also be of value.

We can breed blues much like our existing ones with little difficulty. Providing a wide range of size, shape, and season is in the very near future. The color, however, needs to be made more distinct; it needs to be enhanced. Enhancement is being approached from what is considered to be co-pigmentation. A good example of what happens is seen in some of the blue species. Where the blue veining of the lip overlays the eye-color area, different colors appear. If the eye color is of an orange nature, maroon is the outcome. If the color is a lemon-yellow, the result is a very dark blue.

Since the blue color is very recessive, what criteria must we consider for the enhancement parent? First, it must be the proper lemon-yellow to green. Second, the color must not be overpowering, but must bleach out or be somewhat recessive when bred with labiate cattleyas, especially. Third, it must have little genetic material to produce lavender. (White and white-with-colored-lip cattleyas, as a general rule, have genetic material for lavender.) Fourth, it should be a diploid, especially if any further breeding is to be done. (The blue cattleyas are presumed to be diploids.)

One of the plants that fits the above criteria is *Brassavola digbyana*, and several hybridizers are using it. The one major "unknown" is whether or not enough of the green will be present in the progeny for enhancement. It is definitely felt to be a step in the right direction.

Some fine colored blues (along with several lavenders) have resulted from using *Epidendrum mariae* crossed with *Laeliocattleya* Blue Boy, but *Lc.* Blue Boy with *Blc.* Ojai is producing lavenders.

The first generation of any of the hybrids utilizing blue with "other" colors can be expected to be in the lavender shades, with some possibly having blue casts. However, selfing and/or back-crossing to blue can be expected to give some blues, of which there may be enhanced ones.

Stabilization and enhancement are two main obstacles in producing good blue color in Cattleya. Time, patience, and careful observation will, hopefully, achieve the desired results.

(American Orchid Society Bulletin, Vol. 39, No. 4, April, 1970, pp. 343-344.)

THE BLUE CATTLEYA AND LAELIA SPECIES--REVISITED

In a previous article (A. O. S. Bulletin, Vol. 35, No. 10, 1966, pp. 834-835), an attempt was made to list as completely as possible the blue Cattleya and Laelia species. At the time it was based on all information available. Correspondence relating to the article was received and alterations appeared necessary.

Where, before, the species were listed with specific varieties, the approach here is to take each species and give as much information relating to the blue clones as is available, with mention of varietal names only as is necessary.

Cattleya amethystoglossa: - Several blue forms have resulted from a selfing. The sepals are white with blue spotting. The lip is the same color of blue but is crossed near the throat with lavender.

C. bicolor: - The older literature has mentioned a variety *coerulea*, but no information has been obtained on it other than that it is supposed to have existed.

C. bowringiana: - There are several clones and some selfings which are in the blue shades. The original varieties *lilacina* and *violacea* have not been located. Color is blue, usually with quite a bit of lavender in the sepals, and darker lip. Variety *concolor* is clearer and has literally no darker coloring in the lip.

C. chocoensis: - The few details on this species are that a variety *azulina* exists, having white sepals and a bluish lip.

C. deckeri: - Only one blue form is known of this species, variety 'Blue.' It is difficult to grow and only one division is known to still be alive. It is reported as having bluish sepals and a darker lip.

C. gaskelliana: - A number of blue-lipped forms are known, with the sepals pale blue to off-white. Variety *coerulescens*, used by Coleman, has not been located. Variety 'Blue Dragon' is the most common in the US

C. harrisoniana and *C. loddigesii*: - Some blue shades are known to exist, but they are not considered worthwhile for breeding.

C. intermedia: - Numerous different clones of variety *coerulea* and variety *amethystina* exist. Color in the sepals is white, the lip blue to blue-lavender. A few have pin dots of blue in the sepals, matching the lip color.

C. labiata: - There are several clones of this species in the blue colored phase. The white-tepaled, blue-lip forms are usually called var. *coerulescens*, while the blue-tepaled and blue-lip forms are called var. *coerulea*. Selfings have been made.

C. leuddemanniana: - The information is not too clear on the number of clones - one to three. One I have seen a slide of is very good - variety 'Senora Milan'. It is white with a very fine blue-lavender lip.

C. maxima: - Though previously included in the list, it is felt that the variety *coerulescens* has too much lavender to really be useful in breeding and questionable as to whether to include it as a blue.

C. mendelii: - The two previously noted varieties, 'Lady Coleman' and *leucoglossa*, have not been located. Another variety, *azul*, exists, but no firm details are available, nor if there are any others.

C. mossiae: - Numerous blue clones exist, as do selfings. Variety 'Reineckiana, Blue Lip' is the one in general use for breeding in the U. S. Tepals are generally light to medium blue with a darker blue-veined lip.

C. percivaliana: - There is one known blue-lipped form with bluish sepals - variety 'Ondina.' Another clone is believed to be the same, but as yet this has not been determined.

C. schilleriana: - The blue-veined lip of the coerulescens varieties are the result of a selfing. About eight percent of those raised came out with the blue lip.

C. schroederae: - Blue varieties, *coerulea* and *lilacina*, have not been located, nor have any additional ones.

C. trianae: - Three major varieties, 'Bluebird', *coerulea*, and *azul*, and selfings of variety 'Bluebird' are known. Variety *azul* has white sepals and a blue lip and appears to be the most promising for breeding (from colored slide). Selfings of variety 'Bluebird have been variable in color, and the variety itself has yet to breed blues with others.

C. walkeriana (including *C. nobilior*): - The total number of varieties is unknown; two are known. Tepals are a medium blue. One is nearly concolor. The other has a darker lip.

C. warneri: - The information suggests that only one clone was collected wild, variety *coerulea* 'Miranda'- and that it was selfed. Numerous clones are in existence today. Tepals are a medium blue with a darker lip.

C. warscewiczii (syn. *C. gigas*): - Recently, two varieties have been found and possibly a couple more may be in existence. The varieties are *azul* and 'Helene de Ospina.' The latter one blooms with white sepals and blue-lavender lip for me.

Laelia anceps: - One known variety, *veitchiana*, has been selfed several times. The sepals are white with a blue-lavender lip.

L. autumnalis: - One variety, 'Blue', was listed by the Missouri Botanical Garden several years ago. However, they have not since located it to my knowledge, nor have any others been located with blue coloring.

L. crispa: - One clone, variety *coerulea*, is reported to exist, having white sepals and a blue lip. It was not doing well at last report.

L. perrinii: - Unknown number of clones, though two types are know to exist. One type has white sepals and a blue lip. The other has blue-lavender sepals and darker lip.

L. pumila: - Unknown number of blue clones, but in excess of two varieties of *coerulea* clones exist. One is 'Orchidglade', having blue-lavender sepals and a darker lip. The other is 'werkhauserii', which has white sepals and dark blue lip.

L. purpurata: - The variety *werkhauserii* is well known, though there are very many differing widely in quality of lip color. Tepals are white with the lip veined blue. Two distinct clones are very good -'Divine' and *superba*. The variety *superba* is reported to be the original Werkhauser plant. Its lip is the darkest blue color I have ever seen.

It would be impractical to give any greater detail, since, primarily, there is so much variation in the definition of blue color in these plants and numerous clones. Each person's definition is slightly different, though among those working with the color, a standard is slowly being set. Usually only one or two of the blue varieties are in my personal collection and some of those species listed are not, so direct comparisons cannot be made. Their owners have been kind enough to supply details on these.

Among the major contributors of information, inspiration, plants and pollen are Dr. Gernot Bergold, Gordon Dillon, Gilberto Escobar, Dr. Jose Ettedgui, Tom Fennell, Ernest Hetherington, Leo Holquin, Edward Manda, Dr. Edgar McPeak, Mariano Ospina, Waldemar Silva, Charles Slocum and Eddie Waras. I'll take this opportunity to again thank each of them for their help and give them due recognition for the knowledge and the hard work entailed in digging up much of this information.

(American Orchid Society Bulletin, Vol. 39, No. 5, May, 1970, pp. 422-424.)

CATTLEYA ARIEL COERULEA - THE KEYSTONE OF BLUE BREEDING?

Occasionally one key plant or hybrid is found for all progeny to follow in a line of breeding. *Cattleya intermedia* var. *acquinii* is the progenator of nearly all hybrids with lip coloring on the petals. *Cattleya* Bow Bells has formed a great series of whites. In blue breeding, the evidence points to one hybrid as a keystone for fine, blue-tepaled progeny - *C.* Ariel coerulea.

Cattleya Ariel coerulea was first registered in 1915 by Sir Jeremiah Coleman. Its parents were *C. bowringiana* var. *lilacina* and *C. gaskelliana* var. *coerulescens*. The several flowers are about three and a half inches across, carrying an amount of lavender in the sepals and a strong lavender bar in the lip. The color phase, however, is distinctly shaded blue with the growths showing just a touch of pink. The forelobe of the lip is a dark blue-lavender.

Several clones of this hybrid are available, but there is strong feeling that some are synonymous. No doubt variety 'Bodnant's' is a distinct clone. Varieties 'Bracey', 'MoBotGard' and 'Q's' are considered the same clone by this writer. Several unnamed clones may be the same as these, selfed seedlings, or in truth, *C.* Portia coerulea.

The first hybrid registered with *C.* Ariel coerulea as a parent was *C.* Princess Helen Victoria (x *C. maxima* var. *gigantea*, 1926). The outcome is not known, though, judging from the parentage, it was probably lavenders.

Two other early hybrids are known. One is a selfing which produced progeny of approximately the same color, some with very good shape. The other cross was with *C. guttata* var. *alba* , which resulted in lavenders.

The first truly worthy hybrid was *Laeliocattleya* Blue Boy (*C.* Ariel coerulea 'Bodnant's' x *Lc. elegans* 'werkhauserii', 1960). The flowers are about the same size as *C.* Ariel, having a shape similar to and better than this parent. The *Lc. elegans* parent has muddy greenish sepals with a blue, lavender-barred lip. Laeliocattleya Blue Boy was back-crossed to *C.* Ariel coerulea (*Lc.* Blue Knight, 1964), but I am not aware of the outcome. They can be expected to be of good shape, same general size and color of the laeliocattleya parent.

Laelia purpurata var. *werkhauserii* was also crossed with *C.* Ariel coerulea (*Lc.* Mariner, 1961) and gave Lc. Blue Boy type progeny, but not quite as dark and having a stronger tendency to hold the blue color when grown warm. (It should be noted that at warmer temperatures the blue color does not readily develop. The result is either more lavender shading or white sepals. This condition is what is termed unstable, in the strict sense. However, in this discussion, stability is used to mean having sepal color all the time, regardless of its shift toward lavender.)

One of the recent hybrids utilizing *C.* Ariel coerulea ('Q's') is with the unstable *C. labiata* var. *coerulea* (*C.* Sapphire, 1969). The *C.* Ariel has stabilized the sepal color as a good medium blue. The lip is a dark blue with some lavender shading. Some larger, well-shaped forms are appearing among the progeny which lend themselves favorably to further breeding possibilities.

The blooming season for *C.* Ariel coerulea is fall and, often, spring. This is about the same time for *Lc.* Blue Boy and *Lc.* Mariner. *Cattleya* Sapphire is a fall bloomer.

Laeliocattleya Blue Boy is being used extensively as a parent. The progeny show considerable variation in shape, especially. This is attributed to the *Lc. elegans* influence. Unfortunately, we do not have progeny of *Lc.* Mariner or *C.* Sapphire to discuss at this time, but it is felt that these will have less variability.

Cattleya Ariel coerulea has been considered a good breeder of blues for some time. Though not a truly fine colored blue, it acts nearly neutral with this color, imparting little lavender. It greatly stabilizes the blue sepal colors if they are present. It imparts similar to better shape than its own. Size, in general, is similar to its own, though influenced slightly by the other parent involved. The offspring are vigorous growers.

The reason why *C.* Ariel coerulea is considered so important to blue-tepaled breeding is relatively simple to understand. The material currently available to stabilize the blue color in the sepals is extremely limited. *Cattleya* Portia coerulea does in part stabilize color, but not nearly as well, nor does it give as good a shape. *Cattleya warneri* var. *coerulea* does not appear to stabilize well, from the relatively few progeny that have bloomed, nor is *C. percivaliana* 'Ondina' likely to do so. *Cattleya trianae* 'Blue Bird' has yet to breed a blue, other then when selfed. *Laeliocattleya* Jericho has yet to show just what it will do in breeding. The blue forms of *C. walkeriana* would induce considerable variability.

Unfortunately, blue cattleya breeding is still in its infancy and information is still fairly limited. Based on that which is available, however, it appears well within reason to believe that *C.* Ariel coerulea will be the foundation for the entire blue-tepaled line of breeding. It will be through the use of its larger, tepal-color stabilized progeny that even larger blue-tepaled forms will be derived.

(American Orchid Society Bulletin, Vol. 39, No. 6, June, 1970, pp. 496-498.)

BLUE CATTLEYAS: HOPES, OBSERVATIONS AND ASPIRATIONS

The continuing interest, response and queries regarding the blue Cattleyas and Laelias have been heartening. Much of the correspondence has been regarding the outcome of the crosses and information on breeding. Therefore, I will try to write down most of the information I've heard, read, and noted from my observations of the seedlings as they come into bloom.

The oldest recent hybrid is that involving *C.* Ariel coerulea (*C. bowringiana* var. *lilacina* x *C. gaskelliana* var. *coerulescens*), namely *Lc.* Blue Boy (*C.* Ariel coerulea 'Bodnant's' x *Lc. elegans* 'werkhauserii'). In this hybrid, we found some variability. Small, narrow-petaled varieties and an occasional lavender colored one appeared; however, these never reached the market, being culled at first blooming. In general, however, most were as good if not better in shape than either parent, and of a better blue color. This enhancement (1) came about through the use of *Lc. elegans* 'werkhauserii' which has greenish sepals (from the *C. leopoldii* [*guttata*] parent) and carried through into the progeny. With the blue color in the sepals from *C.* Ariel coerulea a deeper blue resulted.

The second major contribution from *C.* Ariel coerulea was the cross with *L. purpurata* var. *werkhauserii*, named *Lc.* Mariner. The outcome was a fairly uniform group of seedlings having flowers of good form, not much larger than *C.* Ariel coerulea, however. The color was not as deep as in *Lc.* Blue Boy due to the lack of the enhancing green being absent in the other parent.

Continued breeding with *C.* Ariel coerulea produced *C.* Sapphire (the result crossed with *C. labiata* var. *coerulea*), the flowers of which are generally larger and better shaped than the *C.* Ariel parent. The color again did not reach that in *Lc.* Blue Boy but is more consistent from year to year.

Before going on to *Lc.* Blue Boy as a progenator, it would be best to consider *C.* Portia coerulea (*C. bowringiana* var. *violacea* x *C. labiata* var. *coerulea*) directly after *C.* Ariel coerulea. Since the two are very much alike in parentage, it is of interest to note what, if any, differences their progeny show, especially since *C.* Portia coerulea is much more readily available. Fortunately, two hybrids have been made, one of which I am very familiar with, the other I take from information and implication by Wm. Kirch (2).

The first hybrid is *Lc.* Poor Paul (*C.* Portia coerulea x *L. purpurata* var. *werkhauserii*). The outcome has been nearly two distinct groups of seedlings (3). On the one hand, those favoring the *C. bowringiana* parent (of *C.* Portia coerulea) came out in the lavender shades, while those favoring the *C. labiata* parent came with light sepals and blue lavender lips. This indicates to me that the *C. bowringiana* parent used in *C.* Portia coerulea carried more lavender than the one used for *C.* Ariel coerulea.

The second hybrid is *C.* Big Ben (*C.* Portia coerulea x *C. mossiae* 'Reineckiana, Blue Lip'*). From Mr. Kirch's comments, I take it that the hybrid is similar to that of *C.* Sapphire. The *C. mossiae* has imparted shape and size. Vigor, though not mentioned previously, seems similar to

that experienced in *C.* Sapphire. Again, the color is not as good as in *Lc.* Blue Boy as explained above. No lavender shades are reported, however.

> * In searching for information on the background of the blue *C. mossiae* clones, I found that this variety came originally from Dr. Edgar M. McPeak. It carried the varietal name 'Reineckiana, Blue Lip.' Divisions were sent to Mr. Bracey and to Fred A. Stewart, Inc. The one from the Bracey collection was used under the varietal name 'blue', while Stewart's had started using it under the varietal name of 'McPeak's'. I feel the original varietal distinction given by Dr. McPeak should be carried on.

Cattleya Portia coerulea is capable of producing fine blue progeny, especially in combinations as that with *C. mossiae*. I feel *C.* Ariel coerulea has an even greater potential, however (4). It has shown generally higher quality flowers in its offspring, with minimal lavender tones. Even colored, blue-tepaled progeny are the usual case. Fertility is also greater, which is an important point when breeding.

Perhaps the true "test" of this hypothesis will be when the cross of *C.* Ariel coerulea x *C. mossiae* 'Reineckiana, Blue Lip' reaches flowering size and direct comparisons can be made.

Going on to *Lc.* Blue Boy, numerous hybrids have been made, including selfings. Unfortunately, I can only report on two, x *Lc.* Parysatis coerulea and a selfing. With *Lc.* Parysatis coerulea, the results have been variable, though in the blue shades. Many variations in shape and form are especially true. With the selfing, the color is in the blue shades and, although not as wide, there has been similar variation. Wide variation will undoubtedly be characteristic of *Lc.* Blue Boy as a parent. Less can be expected when it is used with the species. Its primary importance is, of course, the enhancing greenish color it carries and passes on, a unique factor at this time.

This is a good opportunity to quickly discuss *Lc.* Parysatis coerulea. It has been fairly well covered in two previous articles (5,6). The conclusions drawn are that there will be variation in the progeny, though not generally wide, some lavender shades will appear, and the size and lip configuration will favor this parent. It is worth noting that crossed with *C. mossiae* 'Reineckiana, Blue Lip', though the blue color was diluted with lavender, the shape was very good.

The first major use of *C. mossiae* 'Reineckiana, Blue Lip' was with *C. intermedia* var. *coerulea* to produce the hybrid *C.* Undine. The outcome was sepals white, occasionally tinged blue, and medium blue veined, somewhat frilly," lips. Shape in the petals and the lip were considerably improved over *C. intermedia*. Kirch unfortunately does not relate what influence it had in the lip of *C.* Big Ben. It had little influence in the lip when crossed with *Lc.* Parysatis coerulea. The *C. mossiae* parent is a vigorous grower, has unstable color in the sepals (being white one year and blue the next), and a fine blue veined lip. The shape is good and it is very fertile.

To draw any conclusions of comparability to the other large labiate Cattleyas, another hybrid with at least one parent in common is necessary. In this case, it is the hybrid *C.* Holdenii (*C. intermedia* var. *amethystina* x *C. warneri* var. *coerulea* 'Miranda') which gives us additional information. This *C. warneri* does not have as good shape as the *C. mossiae*; however, the lip is nearly a solid blue and the color of the sepals is a stable medium light blue. Size is about the

same. Cattleya Holdenii has come with definitely narrower petals in relationship to the parent. The lip is very similar to that of *C. warneri*. The flowers are generally more symmetrical than in *C.* Undine. The color of the lip is very close to that of *C. warneri*) and solid; however, the sepals are white.

My conclusions are that *C. mossiae* 'Reineckiana, Blue Lip' will push for good shape, has good color to give, will influence the lip shape, and of course will cause the lip to be veined. Tepal coloration will be primarily dependent on the other parent for stability.

Using *C. warneri* var. *coerulea* 'Miranda', shape in general will be only slightly influenced, shape of the lip will predominate and its color passed on readily. The stabilizing factor being dominant, as hoped (7), is questionable at this point.

Laeliocattleya Schilleriana (*C. intermedia* var. *amethystina* x *L. purpurata* var. *werkhauserii*) has not been much discussed since little has been done with it. One hybrid, with *Lc.* Parysatis coerulea, came out poorly as for shape and form. The lip, surprisingly, was a very good tone of blue, superior to either parent. *Laeliocattleya* Schilleriana has also been used with *L. purpurata* var. *werkhauserii*, a backcross to one of its parents. The shape was only slightly improved and the lip darkened. As a breeder of future merit, it seems worthless.

Laelia purpurata var. *werkhauserii* has come into the picture several times, with *C.* Ariel coerulea, *C.* Portia coerulea, *C. intermedia* and *Lc.* Schilleriana. Several clones have been used which causes difficulty in analysis, since there is considerable variability among them. In the combinations with the first two mentioned, fairly good, full-lipped forms were used. The last two may have had the *superba* clone as the parent, since the color of the lips is darker and the lip size reduced. A cross of the *superba* clone with a good form of the variety (*werkhauserii*) in Brazil has not produced the deep color of *superba*, but has given some fine dark forms with much nicer lips. Apparently the deep color of *superba* will not show itself completely in the first generation hybrids, though it will darken the color somewhat. The lip will be considerably reduced in size.

Cattleya labiata var. *coerulea* can be examined by looking at *C.* Portia coerulea and *C.* Sapphire. I think that *C. labiata* will work for improving shape and size when used with the smaller types, has good color to pass on, but is unstable like *C. mossiae* 'Reineckiana, Blue Lip' and will depend on the other parent for stability. The veining in the lip will be apparent but not strong. Combined in *C.* Sapphire, it provided more blue color, enhanced the lip (as it did in *C.* Portia coerulea), and generally improved the size. Though the C. labiata var. coerulea clone used in making *C.* Sapphire is not a vigorous grower, these progeny are quite vigorous.

That covers the observations and conclusions drawn in general. However, many of the questions have dealt with the "yet-to-be proven" parents. Those which I consider of major importance are the blue forms of *C. gaskelliana, C. percivaliana, C. warscewiczii* (syn. *gigas*), *L. pumila* and *C. leuddemanniana*. *Laelia pumila* is also considered for use in breeding the unusual and smaller types (8).

Cattleya gaskelliana 'Blue Dragon' is being used with a number of the other labiate Cattleyas and hopefully the first seedlings will bloom this year (with *C. warneri* var. *coerulea* as the other

parent). The lip color will probably be a dominant factor with other blues. Shape will be passed with only general improving qualities. Nothing in itself appears to be outstanding about it; however, in proper combinations (with *C. mossiae* 'Reineckiana, Blue Lip) we should get some very good progeny.

Cattleya percivaliana 'Ondina' holds a promise for pulling bloom time into January. It carries some lavender in the sepals, but this may provide the stabilizing effect needed with some of the others. The shortened lip will probably influence its progeny as it does in its lavender counterparts. The veining of the lip will also be imparted. Shape is good and may help in this area also.

Cattleya warscewiczii (syn. *gigas*) 'Helena de Ospina' and var. *azul* have lovely lip configurations to give. Variety 'Helena de Ospina', in my collection, has not developed the color I had expected, perhaps because of cultural problems. Both varieties are being used as parents with the other parent being identical. We should be able to determine with which to continue breeding as these seedlings reach maturity and bloom.

Laelia pumila var. *coerulea* 'Werkhauserii' has considerable potential both in the color it has in the lip and the flatness it can impart. Although normally white in the sepals, the lip is a solid dark blue. In breeding, general size will be reduced, with the lip even more so (of the other parent). The dark coloration of the lip is not expected to come through completely in the first generation, but it will probably darken the color and provide good genetic material for further breeding.

Cattleya leuddemanniana 'Senora Milan' is frustrating and depressing! My efforts to acquire it have yet to be successful. From the slide I have received, its potential of giving very fine shape and full, dark, solid lip color is one which hopefully we can exploit soon. With *C.* Ariel coerulea, I think it could produce many A. M. quality seedlings. In itself, it is very lovely.

Of course, the target in this breeding line is unquestionable blue color, having little instability, in all sizes and shapes. We have a great deal of material to work with, really. The drawback is, most certainly, limited space, especially for strictly experimental hybrids which are the primary combinations of enhancing and other color factors for further work. However, we have come a long way the last few years and the next should prove even more interesting and fulfilling.

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(The Orchid Digest, Vol. 34, No. 10, December, 1970, pp. 292-295.)

FUNDAMENTALS IN BREEDING FOR BLUE CATTLEYA AND LAELIOCALLEYA HYBRIDS, WITH RECENT NOTES ON NEW DEVELOPMENTS

Introduction

In January of 1958, when the "orchid bug" first bit, little did I realize to what that infestation would lead. Settling on the color blue in Laelias and Cattleyas less than a year later fixed my direction. First was the problem of finding literature about them, of which there was little. The second and most difficult problem was that of locating the plants and acquiring them on a very limited budget. This latter aspect still is present today.

Some of the plants had been previously located by others and were in collections in the area. The major effort, however, was put forth in the summer of 1962 when inquiries were sent throughout the world. Thereafter, a number of species were located and added to the relatively small collection. In 1966, with the writing of several articles for the American Orchid Society Bulletin, and the assistance of Gordon Dillon, its editor, more species were located and acquired. Several of these had hither to fore never been mentioned or had just been collected from the jungles within the last few years. Thus, the collection has reached a point where it is one of the largest collections of unique blue Laelia and Cattleya species in the world.

It had been my original intention to put the collection together, then offer its use for breeding. Mr. Ernest Hetherington of Fred A. Stewart, Inc. was approached with this idea in the spring of 1964. Mr. Hetherington, instead, recommended I do the breeding and that their firm would provide support in the form of handling everything once the pod had been picked. Since there are a limited number of varieties of each species and little knowledge on the breeding of blues, there was little concern about my ignorance of this aspect. So, I became an orchid breeder!

As this is written, the first hybrids have bloomed, with both success and failure in getting what was desired. More information about each plant and its breeding habits is coming to the fore as their progeny mature. Still, much has to be done.

This is part of the "genesis" of one line of breeding. Perhaps it will continue to evolve, or it may again lie dormant as Sir Jeremiah Coleman's work has done for years. In any case, the experience has been quite rewarding, along with a lot of just plain fun.

The Species

The species are the backbone of any breeding program, the "gene bank" from which to draw, to combine and recombine. They have a proud place in any collection as the progenitors of today's fine hybrids and are often called upon to restore vigor and fertility. They are with what this presentation is primarily concerned.

Of the two genera involved, there are four species of Laelia and thirteen species of Cattleya represented in the blue collection. The number of their blue varieties are five and fourteen, respectively. These, of course, are not all the varieties available, but are among those considered the best. Nor are they all the species of these genera having blue varieties. Some are not available at this time. Others have yet to be located.

Cattleya deckeri var. *coerulea*

The late Mr. Milton Kaulman received this plant from Panama some years ago. When he divided it, Mr. Tom Fennell, Jr. purchased two small divisions and sent one to Mr. Ernest Hetherington of Fred A. Stewart, Inc. Only the plant at Stewart's has survived to be propagated.

Cattleya gaskelliana var. *coerulea*

There are several bluish clones of this species, although only one in the collection, crone 'Blue Dragon'. This cloned is believed to have been jungle collected. In June of 1962, when exhibited by Mr. Charles P. Slocum, it received 80 points from the American Orchid Society judging and awarded a Certificate of Botanical Merit. In the spring of 1963, it was added to the collection by trade with Mr. Slocum.

The growing season for this species starts in January with two growth periods occurring prior to its blooming in the early summer with two or three flowers per spike. It then rests until the following year.

The sepals of the flower are white, although on one occasion they were bluish. The lip is blue-lavender with a lavender disc which extends into the throat. The eyes are very pale, while the throat is veined in gold.

Cattleya labiata var. *coerulea* and *Cattleya labiata* var. *coerulescens*

Mr. Luiz Loureiro of Recife, the capital of the Brazilian state of Pernambuco, shipped many of this species to the southern part of the country. He had a small private collection and kept any of the blue varieties he collected. When he had about twenty such plants, he offered them for sale to the orchid fanciers in the southern area.

There are two types of blue varieties. One is termed variety *coerulescens*, if the blue is present only in the lip and the sepals are white. The other is variety *coerulea* which has, in addition to the blue lip, blue sepals. A division of the latter variety was purchased from Mr. Waldemar Silva in 1961, but it died shortly thereafter. Mr. Silva sent another division in July of 1963 to replace the one lost. This plant has subsequently been given the clone name of 'Stewart's'. It is difficult to grow and does not root readily. The first growth produced after the flowers in the fall will mature and may bloom in the early spring. A second growth then matures before summer and remains dormant until the blooms appear in the fall. The flowers of this plant often carry part of the lip color in the ventral sepals. The sepals vary from white to medium blue. The lip is veined with blue-lavender and has yellow-gold eyes.

Cattleya mossiae 'Reineckiana, Blue Lip'

This lovely Venezuelan species is well known to literally everyone. The several blue forms, however, are fairly rare in collections in this country. Most of them have been jungle collected and the collectors or purchasers have generally given each clone a varietal name.

This species has two growing periods during the year. It is dormant from November to February. The blooms, numbering two to five per spike, open in late spring or early summer.

In 1934, and for a number of years thereafter, a jungle collector near El Tocuya, Venezuela, sent from 20 to 50 cases a year of *C. mossiae* to Mr. Edward A. Manda. This variety was among them. Dr. Edgar M. McPeak purchased a division of it from Mr. Manda in the forties. About 1960, Dr. McPeak gave divisions to both B. O. Bracey and Fred A. Stewart, Inc. for use in blue breeding. At this time, it also became known by two other varietal names, 'blue' and 'McPeak's'.

Tepal coloration is white, occasionally medium blue. The lip is one of the most striking of the color group. The typical *C. mossiae* veining coloration is a fairly dark blue. The eyes and throat are an old gold. Where the veining overlays the gold, it becomes crimson lavender.

Cattleya percivaliana var. Ondina

The peasants in the Venezuelan state of Trujillo go to the mountains and collect bagfuls of orchid plants to sell. In 1962, one such bag was sold to Mr. Roberto Stadler of Duaca. Dr. Tareisio Gimenez of Valencia bought a few of the plants from Mr. Stadler, one of which turned out to be the blue variety of the species. It was shown shortly thereafter at the National Orchid Show in Caracas under this varietal name and won an Award of Merit. Dr. Gimenez gave a division of the plant to his friend, Dr. Jose A. Ettedgui, who exhibited it at the First Valencia National Orchid Show in 1964, where it won first prize as Best National Colored Cattleya. A division of it was added to the collection in February of 1967, a gift from Dr. Ettedgui.

Cattleya schilleriana var. *lowii* 'Coerulescens'

A crossing of two clones of *C. schilleriana* yielded seed which was not very fertile. Mr. Rolf Altenburg of Petropolis sowed the seed June 29, 1959, and the first seedlings flowered late in 1964. Only about one hundred plants were raised of which about 8% have become known as clone coerulescens, due to the blue veining of the lip.

The first plant of the coerulescens clone came to the collection April 7, 1967, a gift from Mr. Waldemar Silva. Another plant was received in August of the same year, a gift from Dr. Gernot H. Bergold, but it died shortly thereafter.

Cattleya walkeriana var. *coerulea* and *Cattleya nobilior* var. *coerulea*

These species are native to the Brazilian states of Minas Gerais, Goias, and Mato Grosso, where the blue forms are quite rare. In this area, the single-leaved species is *C. walkeriana*; while the twin-leaved one is called *C. nobilior*, occupying a range much further westward.

Cattleya nobilior var. *coerulea*

This twin-leaved plant came to the collection as *C. walkeriana* var. *coerulea* in May of 1963. Its growth habit requires little resting period, though to insure blooms, it should be given plenty of light and kept fairly dry during the winter months. Two to three growths a year are not uncommon.

The flowers, usually two to four, are borne from a leafless growth, in the spring. The sepals are a fine, medium blue which turns more lavender as the flowers age. The lip is the same color, but has a few dark veins and is splashed with a lemon-yellow disc.

Cattleya walkeriana var. *coerulea* has been found near Itajuba growing and flowering amongst hundreds of normally colored varieties on a bare granite cliff face. Sepals and petals are faintly tinged bluish, the lip a much deeper blue.

Cattleya warneri var. *coerulea*

The formation of an orchid society in the city of Belo Horizonte, Brazil, had a definite effect on the collecting of this species, including the blue varieties. Many of the blue clones now in cultivation are from a selfing of a plant originally owned by Mr. Mario Miranda of Belo Horizonte. A division of the original plant, subvariety 'Miranda', was purchased from Mr. Waldemar Silva in March 1963 and is the one discussed here.

The plant never rests; it is continuously growing throughout the year, with the blooms being produced in early summer from the most recently matured growth. The spike carries from two to four flowers.

Tepal coloration of the flower is medium blue. The solid lip is blue-lavender lacking the characteristic lavender disc. The eyes are pale blue with the throat a lemon yellow.

Laelia perrinii var. *coerulea* 'Leonildo Regado'

The Bocaina Mountain area is near Lima Duarte, Minas Gerais, Brazil. In 1956, a local orchid enthusiast of Juiz de Fora collected several plants of *L. perrinii* from this area. After several months, the plants bloomed. The collector noted one was of unusual color and called upon two of his friends, Mr. Curial and Mr. Leonildo Regado, to assist in its proper classification. Upon examination, the plant was given the appropriate name, variety *coerulea*. The two friends bought the plant and have since distributed several of its divisions. It is the only white with blue lip variety of the species known to exist.

In March of 1963, a division of this plant was added to the collection by purchase from Mr. Waldemar Silva. It subsequently died.

On October 6, 1967, a second division arrived, being sent by Mr. Silva, a gift from Mr. Regado.

Laelia pumila var. *coerulea*

The various blue clones of this species came from the Serra Cipo and Nova Lima localities near the Brazilian city of Belo Horizonte. They were collected primarily by amateur orchid fanciers. Subsequently, some have been lost to cultivation.

The plants grow continuously, with the solitary bloom appearing in early winter and, occasionally, in early spring. When carrying a pod, it passes a growth period.

Subvariety 'Werkhauserii'

This clone, so-called because of its very dark lip, was acquired from Mr. Eddie Waras in October of 1964. The sepals are white to light blue as is the tube. The keels are a pale yellow. The forelobe of the lip is a fine, dark blue.

Laelia purpurata var. *werkhauserii*

The first clones of this variety were collected in 1902 or 1903 by a Mr. Werkhauser. The area in which they were found is known as the Torres Shore which is north of the city of Porto Alegre, Brazil. The varietal name was coined in England after the plant had been sent there. A number of forms are in cultivation and vary considerably. One of the original methods of classifying the white tepaled flowers was by depth of color in the veining in the lip. The bluer ones received the subvariety "No.1," while those with less were "No.2," etc.

Clone 'Divine'

This clone was collected in 1918. It was shown and awarded in an exposition celebrating the Fourth Century of the city of Sao Paulo, Brazil. It was added to the collection in October, 1967, coming from Mrs. Norma Dreher, through the efforts of Mr. Waldemar Silva. The shape is good for the species and the veining of the lip is a fine, dark blue. The lip is less full than in other clones.

Clone *superba*

The finest of the Werkhauser collection rightly deserves this clonal distinction. Collected in 1904, the first division of it was sold in the 1950's for sixty thousand cruzeiros (before inflation). It was enthusiastically welcomed into the collection a few weeks after clone 'Divine', the result of a trade with Mr. Rolf Altenburg. Although somewhat lacking in shape, the veining is a deep, lead-blue.

The Hybrids

With orchids, hybridizing has become an important aspect. Most of today's fine flowers are a result of many generations of breeding. This is not the case, however, when speaking of the blue

Cattleyas, Laelias, and their hybrids. They are not necessarily recent introductions, but in the past, their lack of acceptance all but eliminated the breeding of them.

Laeliocattleya elegans was a natural hybrid of *Laelia purpurata* and *Cattleya guttata*. With the blue variety 'Werkhauserii', the Laelia parent is var. *werkhauserii* of the species. The hybrid plant has one leaf, occasionally two. It has two growth periods a year and may bloom at the time the growth is mature in the spring and fall. The flowers are a greenish white with the forelobe of the lip veined in a frosty blue. The disc in the lip is a dark lavender.

The case for the artificially repeated natural hybrid *Lc. Schilleriana* var. *coerulea* is much the same. Again, the Laelia parent, *L. purpurata*, was variety *werkhauserii*, and was crossed with *C. intermedia* var. *amethystina*. The lip is blue-lavender and the sepals are off-white.

The "Gatton Park Tints" produced by Sir Jeremiah Coleman were the first attempts at producing blue hybrids artificially. We have some of the original crosses still in cultivation. The most popular is *C.* Portia coerulea (*C. bowringiana* var. *violacea* x *C. labiata* var. *coerulea*). This cross was registered in 1907. A similar hybrid, *C.* Ariel coerulea (*C. bowringiana* var. *lilacina* x *C. gaskelliana* var. *coerulescens*) was registered in 1915. A more advanced hybrid, *Brassolaeliocattleya* Victoria coerulea, registered in 1929, has *C.* Portia coerulea as one of the parents and a *C.* Portia coerulea hybrid, *Blc.* Antoinette, as the other. All of these have *C.* Portia type shape, size, and growth habit.

Laeliocattleya Parysatis coerulea is another of Coleman's crosses. Here, *C. bowringiana* var. *lilacina* was crossed with *L. praestans* (*pumila*)'Gatton Park' and registered in 1918. The flowers are smaller but more round than *C.* Portia.

A hybrid was made on June 4, 1946, by Robert Doig, then manager of R. H. Gore - Orchids. The parents were *C.* Remy Cholet 'Gigantea' end *Lc.* Erica Sander 'Brilliant'. The cross was named *Lc.* Jericho. The flowers are large and of good shape. The surprise was that a few came out blue!

Actual blue breeding lay dormant until, in 1959, Lc. Blue Boy was shown in St. Louis, resulting in a considerable stirring of interest in the color. The hybrid was a product of Mr. Ben Bracey's genius. The parents were *C.* Ariel coerulea 'Bodnant's' and *Lc. elegans* 'Werkhauserii'. It is a generally improved *C.* Ariel but with darker blue coloration.

Quickly, breeders crossed literally anything that looked bluish. Few of these hybrids turned up more than an occasional bluish flower and were very discouraging. But not all the hybrids had been done without considerable forethought.

Dr. Edgar M. McPeak was interested in making a cross with the blue-lipped *C. mossiae* 'Reineckiana, Blue Lip' he had. He crossed it with *C. intermedia* var. *amethystina* on June 12, 1959, and hoped that some would come out with blue sepals. In April of 1965, the first seedling bloomed. Although most have had white sepals, many show a touch of blue. The lip is a lovely blue to blue-lavender.

Shortly after *Lc.* Blue Boy was introduced, three or four different strains of *Lc.* Schilleriana appeared. One of these produced progeny with the blue-veined lip. Although lacking in shape, it was a step in the right direction.

Mr. Bracey had not been idle after making *Lc.* Blue Boy. He had another cross registered in 1962 which has given some lovely blues. He used *C.* Ariel coerulea again, with *L. purpurata* var. *werkhauserii* to produce *Lc.* Mariner. In general, they look a great deal like *C.* Ariel coerulea but have better shape and a fuller lip.

This writer was also trying his "luck" and in 1961 crossed *L. purpurata* var. *werkhauserii* with *C.* Portia coerulea. The cross was registered in 1966 as *Lc.* Poor Paul. Overall, it has not been as successful as *Lc.* Mariner, lacking the shape and color.

This brings us to the current hybrids. As there is considerable interest in this color line, the blue hybrids offered are far too numerous to list and evaluate. Hopefully, they will take us further along the road to the perfection we seek.

Hybridizing

At present, little can be said about the genetics of the blue color in the Cattleyas and Laelias. But certain things have been noted.

One of the early observations was that when a plant is crossed with a green, the results are for the colors to be more on the bluish side. Applied to blues, it is suggested that the green will enhance the blue color, as it appears to have done in *Laeliocattleya* Blue Boy. Many breeders are attempting to use this to their advantage, but it must be borne in mind that few greens have no genes for lavender.

Continuing on this same line of thinking, it has been observed in the breeding of blues that a lemon or greenish-yellow veining in the throat enhances the blue coloration, while orange shades turn the blue of progeny more crimson. The enhancement noted is believed a product of copigmentation.

The breeder must take into consideration the variability of the blue color under different environments. The objective is to produce a blue color which will vary little with the conditions. It is suggested that only the bluest of those plants grown under normal conditions be used as breeders in order to stabilize the color.

When breeding, it must be remembered that the blue color is extremely recessive, except with the Laelias where it is only partially dominant, at best.

Embryo Culturing

Embryo culturing has proven invaluable in working with the blue color line. A number of the species and hybrids will not carry a pod to maturity, and those that do often give little viable seed. The advantages of saving time, less drain on the plant, and better germination are well

worth consideration. The lengths of time noted below for the blue varieties of the species and hybrids are from the time of pollenating the flower to the removal of the pod. They are not optimal minimums but are workable and can serve as a guide to those interested in this technique.

6 months
- labiate Cattleyas
- L. perrinii
- L. purpurata
- Lc. Jericho

5 months
- C. Portia
- C. Undine
- Lc. Blue Boy
- Lc. Mariner
- Lc. Poor Paul
- Lc. Schilleriana

4 1/2 - 5 months
- C. Ariel (watch carefully for signs of splitting)
- C. intermedia
- L. anceps (column may dry, stem turn yellow)

3 1/2 - 4 months
- Lc. Parysatis (remove when column yellows)

Conclusion

Regarding this presentation, I hope it has served its purpose, i.e., to acquaint the unfamiliar with this color line, to provide more information on this color and the species and hybrids involved, and to provide a photographic reference to which to turn. Certainly, more blue varieties of the species will be found and numerous hybrids made. The search for the "true blue" will continue.

Hopefully, this is only the first edition of this manuscript, and as we progress, changes and updating will be necessary. May I ask you, the reader, to feel free to inquire about, critique, or add to any information presented. If you have, or run across a blue form of a species not listed, please be kind enough to notify me. Your help would be most gratefully appreciated.

(The Orchid Digest, Vol. 36, No. 6, November-December, 1972, pp. 201-204.)

AN UPDATE ON BLUE CATTLEYA BREEDING

Several years ago, when articles on breeding blue cattleyas first began appearing, there was considerable speculation as to what exactly the outcome would be. And, as more species-breeding material became available, the possibilities were further compounded.

In this presentation, two factors need to be kept in mind. First, due to my considerable traveling in the last few years, I have been unable to see very large blocks of seedlings come into bloom. Those which I have seen are considered as representative of the cross.

Secondly, the parents are those clones I've described previously (1) and the hybrids are progeny of these clones.

The majority of the initial set of hybrids have now flowered and much more concrete information on the breeding is available. We will discuss the hybrids in respect to the parents; thus, those characteristics having major impact can be examined. Of primary interest, of course, are those hybrids giving us good blues. Though we are using some hybrids in this line of color development, they are considered as part of the first phase since their parent clones are generally not available to determine their interaction with the parents we are using.

Laeliocattleya Parysatis coerulea (*C. bowringiana* var. *lilacina* x *L. praestans* [*pumila*] 'Gatton Park') figures heavily in the early breeding with large cattleyas (2, 3). Many seedlings showed sign of aneuploidy or other genetic difficulties. The seedlings had considerable variation in shape and ranged in color through the lavenders to the blue tones. Size was in the 3-4" range. Some have been quite good.

Cattleya Ariel coerulea (*C. bowringiana* var. *lilacina* x *C. gaskelliana* var. *coerulescens*), principally the variety Bodnant's, also made a major impact as it was used to make *Lc.* Blue Boy (*C.* Ariel coerulea x *Lc. elegans* 'werkhauserii'). It has continued to provide fine, medium-sized blues when used with the larger blue cattleyas (4). An occasional lavender may appear in the progeny, but very seldom. Growth is relatively uniform in the progeny.

Selfings of *Lc.* Blue Boy have not proven of exceptional value, but with other parents, good shape and clear coloring are the general rule. Often the lavender bar in the lip is entirely absent. Size is determined primarily by this parent.

Laeliocattleya Schilleriana (blue strain) (*C. intermedia* x *L. purpurata*) has not proven worthwhile as a parent. There is usually a considerable amount of lavender in the lip and the shape is relatively poor, though the size is generally on the larger end.

Laeliocattleya elegans 'werkhauserii' (*C. leopoldii* [*guttata*] x *L. purpurata*) has given very interesting results. Generally, the shape is on the open side, and the size is medium to medium large. In *Lc.* Dellensis (*Lc. elegans* 'werkhauserii' x *L. purpurata* var. *werkhauserii* 'superba'), some extremely fine indigo-lipped, white to off-white tepaled progeny have occurred. One had a touch of lavender in the petals. In *Lc.* At Dusk (*Lc. elegans* 'werkhauserii' x *C. walkeriana* var. *nobilior* 'coerulea') rather interesting things are happening with off-white sepals and fascinating

shapes. Lip coloration is of good blue shades. Lavender shades are occasionally appearing in both crosses, as is the lavender bar in the lip.

For breeding the cooler-growing blues, *L. anceps* var. *veitchiana* has been used. It does not have as deep a blue color in the lip as the others but does provide enough for a good blue color to come though. *Laelia* Amoena (*L. anceps* var. *veitchiana* x *L. pumila* var. *coerulea* 'werkhauserii') varied in petal color from white to pastel blue. Lip color has been shades of blue lavender to very nice blues. Quite often the progeny will have lavender in the lip from the *L. anceps* parent. A more open shape is also imparted in general.

Laelia pumila var. *coerulea* 'werkhauserii' has proven to be one of the finer blue breeders. It has some influence on sepal color but this is usually determined by the other parent. The lips of the progeny are usually shortened but are of a fine, dark, solid blue. Petal width is generally reduced, as is the number of flowers. There is an occasional feathering of the lip color in the petals which is quite attractive. Perhaps the finest hybrid to date having this as one parent is *Lc.* Lorna Dene Whitlow (*L. pumila* var. *coerulea* 'werkhauserii' x *C. mossiae* 'Reineckiana, Blue Lip'). Here, some exceptionally fine blue-tepaled forms have appeared, having superb lip coloration, shape and size.

Laelia purpurata var. *werkhauserii* 'superba' as a parent, usually results in flowers with sepals slightly twisted, and with the shortened lip of this clone. Color of the lip has been very nice and generally dark blue, while sepals are white to blue tinted.

Cattleya walkeriana var. *nobilior* 'coerulea' has imparted the shape one generally recognizes as typical of the breeding. Some lovely shades of blue varying from light to medium are appearing. Generally the concolor characteristic of this clone comes through. In the discussion that follows, *C. walkeriana* is considered in the same type category as *C. warneri*.

Cattleya Undine (*C. mossiae* 'Reineckiana, Blue Lip' x *C. intermedia* var. *coerulea*) has given some very nicely-shaded semicoeruleas. The sepals are white, occasionally a pastel, but the lips are a very pleasing shade of blue. Because of the light coloration in the sepals further breeding with this hybrid is being discontinued. Also based on these results, hybrids using *C.* Holdenii (*C. warneri* var. *coerulea* 'Miranda' x *C. intermedia* var. *amethystina*) are not being made.

The blue unifoliates will be discussed as a group. All generally give good shape. *Cattleya gaskelliana* 'Blue Dragon' usually suppresses some of the sepal coloration. Both *C. mossiae* 'Reineckiana, Blue Lip' and *C. percivaliana* 'Ondina' are strong for the orange throat with the veining overlaying the region, the result being crimson lavender in that area. The latter, however, tends to shorten the lip considerably. *Cattleya warneri* var. *coerulea* 'Miranda' tends to stabilize the sepal coloration and draw blue color into the sepals. The *C. labiata* var. *coerulea* 'Stewart's' used has a peloria which occasionally shows up in the progeny; however, its good color potential and fall blooming habit outweigh this drawback.

Perhaps the most important of the results is what appears to be a segregation of two different types of blues in this group, one characterized by *C. warneri* var. *coerulea* 'Miranda' end the other by *C. mossiae* 'Reineckiana, Blue Lip'. In the hybrid of the two plants, i.e., *C.* Intertexta,

coloration has been somewhat lighter than would be expected. Likewise, in *C.* Peregrine (*C. mossiae* 'Reineckiana, Blue Lip' x *C. percivaliana* 'Ondina') the same occurs. A segregation of the species into two types has been made and is noted below. These are preliminary results and are presented only for discussion.

Type I:

C. warneri var. *coerulea* 'Miranda'
C. percivaliana 'Ondina'
C. gigas 'Helene de Ospina'

Type II:

C. mossiae 'Reineckiana, Blue Lip'
C. gaskelliana 'Blue Dragon'
C. labiata var. *coerulea* 'Stewart's'

If a Type I species is crossed with another Type I, the results should be as good or better than one or the other parent in respect to color. Likewise, utilizing a Type I hybrid (Type I x Type I) with another Type I hybrid or species should do the same. A relatively uniform coloration would probably develop after several generations. In Type II breeding, much the same would likely result.

However, if a Type I species or hybrid is crossed with a Type II species or hybrid, coloration is lighter than can be expected from either parent. This we will consider a Type III hybrid.

If the theory of two type of blues holds true, then by crossing a Type III hybrid with another Type III hybrid, a much wider range of blue coloration may be possible. The darkest of these would then be utilized with other Type III hybrids to develop a line of blues which approach the full, blue color potential.

A Type III hybrid with either a Type I or Type II species or hybrid will give a wider range in blue coloration. However, this should not result in as dark a blue coloration as in the Type III line breeding. The outcome expected would be similar to half being a hybrid of the same type, either Type I or Type II, the other half being similar to a hybrid of the other type.

One hybrid worth noting is *Bc.* Digbyano-warneri (*B. digbyana* x *C. warneri* var. *coerulea* 'Miranda'). The progeny of this hybrid have had nice lavender shades as expected. The importance of this hybrid is the incorporation into the blue line of breeding of some of the green color of *B. digbyana*. One other hybrid is currently projected using a clone of this hybrid, a backcross to *C. warneri* var. *coerulea*. From the results we should be able to make some conclusions on the number of genes involved in the production of blue color and if the green coloration of *B. digbyana* can be used for enhancement (5) of the blue coloration.

The first major generation of blues has become a reality. The second is taking shape. Excited as we were with the first hybrids, we now look with as much, if not more excitement at the possibility of even finer blues to come.

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(American Orchid Society Bulletin, Vol.45, No.1, January, 1976, pp. 43-47.)

PHOTOGRAPHING THE BLUE CATTLEYAS

This little chapter on photographing the blues is based on what I have found that gives the best rendition of color of the flower under the conditions I have experienced and the films I have used. I say "best rendition of color" because even applying this information does not guarantee success nor true color.

As noted in the articles, the blue coloring in Cattleyas is a difficult one to identify and to capture on film. Under incandescent light, most blues cease to be blue. Films which are rich in color usually are made in such a way that the great variance of the blue end of the spectrum does not have a major effect on the color. Unfortunately, it is the fine blue coloration which we wish to capture.

I have found that bright midday shade gives the best condition for photographing the blue color. The film I use is daylight type Ektachrome, which seems to capture the blue tones more readily. Kodachrome is used on other colored flowers with good success - but not with the blues.

To enhance the color, an 82A filter may be used as well. However, the blue resulting from the use of the filter is not an accurate one, but does bring it more in line with the true color.

I always take a number of shots, with and without the filter, and with a range of exposures. After development, I select the ones which are closest to the actual color by direct comparison to the flower, if possible.

PROLOGUE

When B. O. Bracey first showed *Laeliocattleya* Blue Boy, there were a few blue Cattleya and Laelia species and hybrids to work with, at least in some of the commercial hybridizing establishments, and they used them. Since the early 70's though, most of the collections that were built up seem to have fallen on hard times.

Blue Cattleya hybrids continue to appear, to some extent, though only occasionally. Mericlones of a number of the finer clones have appeared on the market off and on. But, much of the hybridizing has gone back to the hybridizer having a couple of plants and hybridizing them.

In Brazil, Rolf Altenburg continues to develop some nice blues. Fortunately, these are finding their way into the United States and supplementing our production. In Hawaii, some nice things have also been produced.

However, it appears that it is again time for the blues to "come around". Some concentrated efforts are being made to improve on what we have accomplished. May they be rewarded for their efforts!

When I started with the blues, very little had been done with the color. Today, many hybrids have been produced with three and four generations in the background. New and finer species have been located or developed from which remakes hold even greater promise. However, we must be careful that too much emphasis is not put on shape and size, and sacrifice the best blue color.

And so, the quest for the true blue Cattleya continues . .

Carson E Whitlow
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March 21, 1990

APPENDIX

CROSSES PRODUCED IN ASSOCIATION WITH FRED A. STEWART ORCHIDS
June, 1964 - June, 1969

Parent Other Parent (*.indicates pod bearer)	Hybrid Name	Stewarts Number & Date of Pollenation
C. amethystoglossa 'Blue Cast'		
.x C. mossiae 'Reineckiana, Blue Lip'*		1451 6/24/67
.x C. warneri 'coerulea' "Miranda"*		1450 6/24/67
L. anceps 'veitchiana'		
*.x Lc. Blue Boy 'Q's #3'	Lc. Blue Kahili	1286 11/20/65
.x C. mossiae 'Reineckiana, Blue Lip'*	Lc. Daisy	1445 6/24/67
*.x L. pumila 'coerulea' "werkhauserii"	L. Amoena	1374 12/31/66
.x C. walkeriana 'nobilior' "coerulea"*	Lc. Twilight Song	1410 4/8/67
C. Ariel coerulea 'Bodnant's'		
*.x C. gaskelliana 'Blue Dragon'	C. Chilean Lakes	1479 10/6/67
*.x C. percivaliana 'Ondina'		1519 3/9/68
*.x L. pumila 'coerulea' "werkhauserii"		1388 2/11/67
.x C. Undine 'semicoerulea #1'*	C. Persian Blue	1346 4/30/66
.x C. Undine 'semicoerulea #4'*	C. Persian Blue	1279 10/3/65
*.x C. walkeriana 'nobilior' "coerulea"	C. Sir Jeremiah Colman	1422 5/6/67
*.x C. warneri 'coerulea' "Miranda"	C. Carribean Skies	1180 10/23/64
C. Ariel coerulea 'Q's'		
*.x C. labiata 'coerulea' "Stewart's"	C. Sapphire	1223 10/7/64
Lc. Blue Boy 'Paul's'		
.x C. maxima 'coerulescens'*	Lc. Arcadian Skies	1249 ?/1964
Lc. Blue Boy 'Q's #1'		
*.x C. gaskelliana 'Blue Dragon'	Lc. Sea of Cortez	1285 10/16/65
*.x C. mossiae 'Reineckiana, Blue Lip'	Lc. Clear Blue Skly	1282 10/16/65
.x Lc. Parysatis coerulea*	Lc. Hawaiian Blue	1196 11/20/64
*.x C. Portia coerulea 'Thielst's'	Lc. Blue Queen	1284 10/23/65
*.x C. warneri 'coerulea' "Miranda"	Lc. Blue Ribbon	1337 6/4/66
Lc. Blue Boy 'Q's #2'		
*.x C. Portia coerulea 'Thielst's'	Lc. Blue Queen	1280 10/23/65

Lc. Blue Boy 'Q's #3'		
.x L. anceps 'veitchiana'*	Lc. Blue Kahili	1286 11/20/65
.x C. Portia coerulea 'Blue Horizon'*	Lc. Blue Queen	1281 11/6/65
Lc. Blue Boy 'Trident'		
*.x L. pumila 'coerulea' "werkhauserii"		1409 2/19/67
*.x C. walkeriana 'nobilior' "coerulea"	Lc. Blue Dynasty	1426 5/6/67
C. bowringiana 'alpha'		
*.x C. mossiae 'Reineckiana, Blue Lip'		1489 11/2/67
*.x L. pumila 'coerulea' "werkhauserii"	Lc. Parysatis	1502 11/2/67
*.x C. warneri 'coerulea' "Miranda"	C. Chapmanii	1488 11/2/67
Brassavola digbyana 'Green Ice'		
.x C. warneri 'coerulea' "Miranda"*	Bc. Digbyano-warneri	1342 7/6/66
Lc. elegans 'werkhauserii'		
.x Lc. Parysatis coerulea*		1533 6/15/68
*.x L. purpurata 'werkhauserii' "superba"	Lc. Dellensis	1531 7/27/68
.x C. walkeriana 'nobilior' "coerulea"*	Lc. At Dusk	1491 5/31/67
C. gaskelliana 'Blue Dragon'		
*.x (self)	C. gaskelliana	1444 6/24/67
.x C. Ariel coerulea 'Bodnant's'*	C. Chilean Lakes	1479 10/6/67
.x Lc. Blue Boy 'Q's #1'*	Lc. Sea of Cortez	1285 10/16/65
*.x C. gigas 'Helene de Ospina'	C. Harold	1544 6/15/68
*.x C. labiata 'coerulea' "Stewart's"	C. Alcimeda	1439 6/24/67
*.x C. mossiae 'Reineckiana, Blue Lip'	C. Suzanne Hye	1443 6/24/67
*.x C. mossiae 'Reineckiana, Blue Lip'	C. Suzanne Hye	1459 6/24/67
.x Lc. Parysatis coerulea*	Lc. Merced Skies	1103 7/17/64
.x Lc. Parysatis coerulea*	Lc. Merced Skies	1195 7/17/64
*.x L. pumila 'coerulea' "werkhauserii"	Lc. Gaskell-Pumila	1441 6/24/67
*.x L. purpurata 'werkhauserii' "superba"	Lc. C. G. Roebling	1652 6/14/69
*.x C. Undine 'semicoerulea #2'	C. Brenda	1447 6/24/67
*.x C. warneri 'coerulea' "Miranda"	C. Mrs. Myra Peeters	1198 7/11/65
C. gigas 'azul'		
.x C. mossiae 'Reineckiana, Blue Lip'*	C. Enid	1694 5/31/69
.x C. warneri 'coerulea' "Miranda"*	C. Dupreana	1655 5/31/69
C. gigas 'Helene de Ospina'		
.x C. gaskelliana 'Blue Dragon'*	C. Harold	1544 6/15/68
*.x C. mossiae 'Reineckiana, Blue Lip'	C. Enid	1690 6/14/69
*.x L. purpurata 'werkhauserii' "superba"	Lc. Callistaglossa	1643 6/14/69
.x C. warneri 'coerulea' "Miranda"*	C. Dupreana	1545 6/1/68
C. intermedia 'amethystina' "Haines"		
*.x C. warneri 'coerulea' "Miranda"	C. Holdenii	1199 6/5/65

Lc. Jericho 'Linda Vista'

.x C. mossiae 'Reineckiana, Blue Lip'*		1455 7/14/67
.x C. Woltersiana*	Lc. Sanoma Skies	1248 ?/1964

C. labiata 'coerulea' "Stewart's"

*.x (self)	C. labiata	1494 10/6/67
.x C. Ariel coerulea 'Q's'*	C. Sapphire	1223 10/7/64
.x C. gaskelliana 'Blue Dragon'*	C. Alcimeda	1439 6/24/67
.x C. mossiae 'Reineckiana, Blue Lip'*	C. Oenone	1458 6/24/67
.x C. percivaliana 'Ondina'*	C. Lord Derby	1619 1/18/69
.x L. purpurata 'werkhauserii' "superba"*	Lc. Bella	1628 5/13/69
.x C. warneri 'coerulea' "Miranda"*	C. Purity	1460 6/24/67

Lc. Mariner 'Querido'

*.x C. warneri 'coerulea' "Miranda"	Lc. Clear Lake	1389 12/31/66

C. mossiae 'Reineckiana, Blue Lip'

*.x C. amethystoglossa 'Blue Cast'		1451 6/24/67
*.x L. anceps 'veitchiana'	Lc. Daisy	1445 6/24/67
.x Lc. Blue Boy 'Q's #1'*	Lc. Clear Blue Sky	1282 10/16/65
.x C. bowringiana 'alpha'*		1489 11/2/67
.x C. gaskelliana 'Blue Dragon'*	C. Suzanne Hye	1443 6/24/67
.x C. gaskelliana 'Blue Dragon'*	C. Suzanne Hye	1459 6/24/67
*.x C. gigas 'azul'	C. Enid	1694 5/31/69
.x C. gigas 'Helene de Ospina'*	C. Enid	1690 6/14/69
*.x Lc. Jericho 'Linda Vista'		1455 7/14/67
*.x C. labiata 'coerulea' "Stewart's"	C. Oenone	1458 6/24/67
.x Lc. Parysatis coerulea*	Lc. Sierra Skies	1081 6/13/64
*.x C. percivaliana 'Ondina'	C. Peregrine	1708 7/10/68
*.x L. pumila 'coerulea' "werkhauserii"	Lc. Lorna Dene Whitlow	1457 6/24/67
*.x L. purpurata 'werkhauserii' "superba"	Lc. Canhamiana	1550 8/10/68
.x Lc. Schilleriana 'Werkhauserii #3'*	Lc. Fortuna	1201 6/12/65
.x C. Undine 'semicoerulea #3'*	C. Magali Sander	1217 6/11/65
*.x C. walkeriana 'nobilior' "coerulea"	C. Eros	1340 6/28/66
*.x C. warneri 'coerulea' "Miranda"	C. Intertexta	1197 6/12/65

Lc. Parysatis coerulea

*.x Lc. Blue Boy 'Q's #1'	Lc. Hawaiian Blue	1196 11/20/64
*.x Lc. elegans 'werkhauserii'		1533 6/15/68
*.x C. gaskelliana 'Blue Dragon'	Lc. Merced Skies	1103 7/17/64
*.x C. gaskelliana 'Blue Dragon'	Lc. Merced Skies	1195 7/17/64
*.x C. mossiae 'Reineckiana, Blue Lip'	Lc. Sierra Skies	1081 6/13/64
*.x Lc. Schilleriana 'Werkhauserii #3'	Lc. Whitlow's Province	1170 5/15/65
*.x C. warneri 'coerulea' "Miranda"	Lc. Shasta Skies	1220 7/7/65

C. percivaliana 'Ondina'		
*.x (self)	C. percivaliana	1622 1/18/69
.x C. Ariel coerulea 'Bodnant's'*		1519 3/9/68
*.x C. labiata 'coerulea' "Stewart's"	C. Lord Derby	1619 1/18/69
.x C. mossiae 'Reineckiana, Blue Lip'*	C. Peregrine	1708 7/10/68
.x C. warneri 'coerulea' "Miranda"*	C. Perci-warner	1546 6/1/68
C. Portia coerulea 'Blue Horizon'		
*.x Lc. Blue Boy 'Q's #3'	Lc. Blue Queen	1281 11/6/65
C. Portia coerulea 'Thielst's'		
.x Lc. Blue Boy 'Q's #1'*	Lc. Blue Queen	1284 10/23/65
.x Lc. Blue Boy 'Q's #2'*	Lc. Blue Queen	1280 10/23/65
*.x C. warneri 'coerulea' "Miranda"	C. Joan Landsberg	1361 11/11/66
L. pumila 'coerulea' "werkhauserii"		
.x L. anceps 'veitchiana'*	L. Amoena	1374 12/31/66
.x C. Ariel coerulea 'Bodnant's'*		1388 2/11/67
.x Lc. Blue Boy 'Trident'*		1409 2/19/67
.x C. bowringiana 'Alpha'*	Lc. Parysatis	1502 11/2/67
.x C. gaskelliana 'Blue Dragon'*	Lc. Gaskell-Pumila	1441 6/24/67
.x C. mossiae 'Reineckiana, Blue Lip'*	Lc. Lorna Dene Whitlow	1457 6/24/67
L. purpurata 'werkhauserii' "superba"		
*.x (self)	L. purpurata	1632 5/31/69
.x Lc. elegans 'werkhauserii'*	Lc. Dellensis	1531 7/27/68
.x C. gaskelliana 'Blue Dragon'*	Lc. C. G. Roebling	1652 6/14/69
.x C. gigas 'Helene de Ospina'*	Lc. Callistaglossa	1643 6/14/69
*.x C. labiata 'coerulea' "Stewart's"	Lc. Bella	1628 5/13/69
.x C. mossiae 'Reineckiana, Blue Lip'*	Lc. Canhamiana	1550 8/10/68
*.x C. warneri 'coerulea' "Miranda"	Lc. Eximea	1560 7/27/68
.x C. warneri 'coerulea' "Miranda"*	Lc. Eximea	1692 5/31/69
Lc. Schilleriana 'Werkhauserii #2'		
*.x C. warneri 'coerulea' "Miranda"		1200 6/5/65
Lc. Schilleriana 'Werkhauserii #3'		
*.x C. mossiae 'Reineckiana, Blue Lip'	Lc. Fortuna	1201 6/12/65
.x Lc. Parysatis coerulea*	Lc. Whitlow's Province	1170 5/15/65
C. Undine 'semicoerulea #1'		
*.x C. Ariel coerulea 'Bodnant's'	C. Persian Blue	1346 4/30/66
C. Undine 'semicoerulea #2'		
.x C. gaskelliana 'Blue Dragon'*	C. Brenda	1447 6/24/67
*.x C. warneri 'coerulea' "Miranda"	C. Trentino	1202 6/5/65
C. Undine 'semicoerulea #3'		
*.x C. mossiae 'Reineckiana, Blue Lip'	C. Magali Sander	1217 6/11/65
C. Undine 'semicoerulea #4'		
*.x C. Ariel coerulea 'Bodnant's'	C. Persian Blue	1279 10/3/65

C. walkeriana 'nobilior' "coerulea"

*.x (self)	C. walkeriana	1416 4/8/67
*.x L. anceps 'veitchiana'	Lc. Twilight Song	1410 4/8/67
.x C. Ariel coerulea 'Bodnant's'*	C. Sir Jeremiah Colman	1422 5/6/67
.x Lc. Blue Boy 'Trident'*	Lc. Blue Dynasty	1426 5/6/67
.x Lc. elegans 'werkhauserii'*	Lc. At Dusk	1491 5/31/67
.x C. mossiae 'Reineckiana, Blue Lip'*	C. Eros	1340 6/28/66
.x C. warneri 'coerulea' "Miranda"*	C. Sea Breeze	1343 7/6/66

C. warneri 'coerulea' "Miranda"

*.x (self)	C. warneri	1543 6/1/68
*.x C. amethystoglossa 'Blue Cast'		1450 6/24/67
.x C. Ariel coerulea 'Bodnant's'*	C. Carribean Skies	1180 10/23/64
.x Lc. Blue Boy 'Q's #1'*	Lc. Blue Ribbon	1337 6/4/66
.x C. bowringiana 'alpha'*	C. Chapmanii	1488 11/2/67
*.x B. digbyana 'Green Ice'	Bc. Digbyano-warneri	1342 7/6/66
.x C. gaskelliana 'Blue Dragon'*	C. Mrs. Myra Peeters	1198 7/11/65
*.x C. gigas 'azul'	C. Dupreana	1655 5/31/69
*.x C. gigas 'Helene de Ospina'	C. Dupreana	1545 6/1/68
.x C. intermedia 'amethystina' "Haines"*	C. Holdenii	1199 6/5/65
*.x C. labiata 'coerulea' "Stewart's"	C. Purity	1460 6/24/67
.x Lc. Mariner 'Querido'*	Lc. Clear Lake	1389 12/31/66
.x C. mossiae 'Reineckiana, Blue Lip'*	C. Intertexta	1197 6/12/65
.x Lc. Parysatis coerulea*	Lc. Shasta Skies	1220 6/13/64
*.x C. percivaliana 'Ondina'	C. Perci-warner	1546 6/1/68
.x C. Portia coerulea 'Thielst's'*	C. Joan Landsberg	1361 11/11/66
.x L. purpurata 'werkhauserii' "superba"	Lc. Eximea	1560 7/27/68
*.x L. purpurata 'werkhauserii' "superba"	Lc. Eximea	1692 5/31/69
.x Lc. Schilleriana 'Werkhauserii #2'*		1200 6/5/65
.x C. Undine 'semicoerulea #2'*	C. Trentino	1202 6/5/65
*.x C. walkeriana 'nobilior' "coerulea"	C. Sea Breeze	1343 7/6/66

It would be nice to have a division of each of the hybrids in my collection.
But, where have they gone to?

Photographs of Plants Taken in the 1960's

Laelia purpurata var. werhauserii

Laelia purpurata var. werkhauserii 'superba'

Laelia anceps var. veitchiana

Laelia pumila var. coerulea

Laelia perrinii var. coerulea 'Leonildo Regado'

Cattleya labiata var. coerulea (Photo by G. Bergold)

Cattleya gaskeliana var. coerulea 'Blue Dragon'

Cattleya warneri var. coerulea 'Miranda' FCC/AOS

Cattleya mossiae var. coerulea 'Reineckiana, Blue Lip' (aka 'Blue' and 'McPeak's')

Cattleya percivaliana var. coerulea 'Ondina'

Cattleya gigas (warscewiczii) var. coerulea 'Helena de Ospina'

Cattleya leudemanniana (speciosissima) var. coerulea 'Señora Milan'

Cattleya walkeriana var. nobilior fma. coerulea

Cattleya amethystaglossa var. coerulea 'Malibu'

Cattleya schilleriana var. coerulescens (photo by G. Bergold)

Cattleya intermedia var. amethystina

Cattleya loddigesii var. coerulea 'Blue Sky'

Cattleya bowringiana var. coerulea 'Blue Angel'

Laeliocattleye elegans 'werkhauserii'

Laeliocattleya Schilleriana 'coerulea'

Cattleya Portia coerulea 'Thiest's'

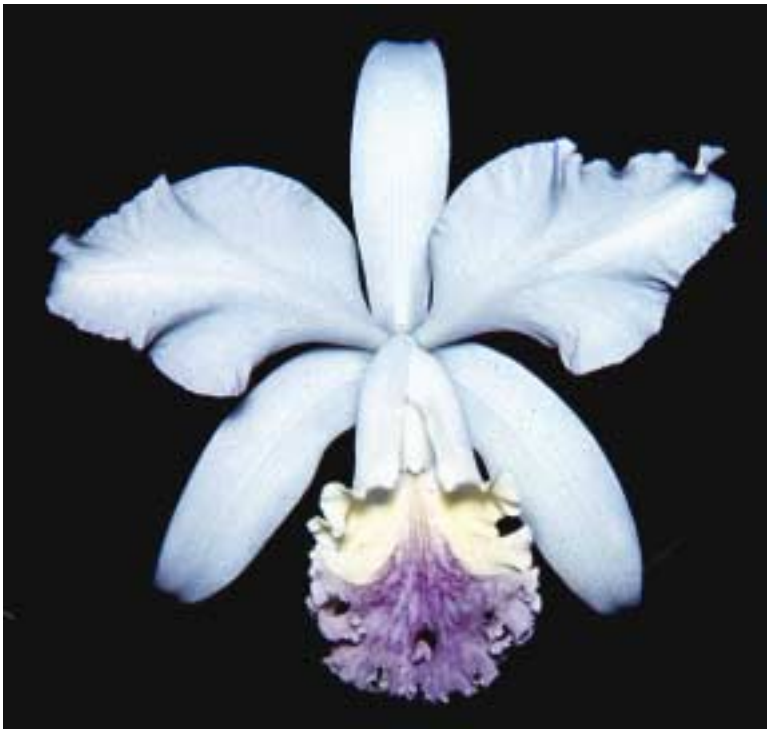
Cattleya Ariel coerulea 'Bodnant's'

Brassolaeliocattleya Victoria coerulea 'Bluebird'

Laeliocattleya Parysatis coerulea

Laeliocattleya Jericho 'Salinas Blue'

Lc. Blue Boy 'Blue Angel'



Cattleya Undine 'semicoreulea #5'

Laeliocattleya Schilleriana

Laeliocattleya Mariner 'Querido'

Cattleya Sapphire 'coerulea'

Laeliocattleya Whitlow's Province

Cattleya Holdenii 'semicoerulea'

Laeliocattleya Eximea 'coerulea'

Laeliocattleya Dellensis 'Violet Eloquence'

Laelia Amoena 'Blue Magic'

Cattleya Mrs. Myra Peeters 'coerulea'

Cattleya Peregrine 'coerulea' "Blue Swan"

Cattleya Purity 'coerulea'

Cattleya Sea Breeze

Recent Photographs Taken with Digital Camera

Cattleya bowringiana var. coerulea 'Blue Smoke' (2007)

Cattleya Intertexta coerulea

Cattleya Purity 'coerulea' "Whitlow's"

Cattleya Regina 'coerulea'

Cattleya Sapphire 'Grin Stan'

Laelia Amoena 'Carson Whitlow' AM/AOS (Photo by Keith Davis)

Laeliocattleya Bella 'coerulea'

Laeliocattleya Blue Boy 'Gainsborough

Laeliocattleya Eximea 'Lorraine'

Laeliocattleya Gaskell-Pumila 'Blue Queen'

Laeliocattleya Granier's Dream 'Elaine' AM/AOS

Laeliocattleya Mary Elizabeth Bohn 'Royal Flare'

Laeliocattleya Memorial Francis Tamaqua

Laeliocattleya Mini Purple 'H&R'