

**Cynoches Ventricosum** Batem. var. **Chlorochilon** (Klotzsch) P. H. Allen Comb. Nov.  
(**Cynoches Chlorochilon** Klotzsch, 1838)

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## I. INTRODUCTION

Opinions may vary as to what makes a desirable orchid, however most orchidists will agree on several factors that one would expect in a good orchid. These would be good size, nice form, pleasant fragrance, attractive color and ease of culture. Few orchids possess all of the above, but among the few, one can list the subject of the present paper — *Cynoches chlorochilon* or more properly *Cynoches ventricosum* var. *chlorochilon* — the most popular member of the genus *Cynoches*. Some growers do not think much of it, while others consider it worth any amount of work mainly because of its interesting habit and considerable beauty and also because of its possible use for fine corsages and displays.

In preparing this paper we have attempted to review a great deal, if not most, of the literature on the species as an addition to our own experience with it. By permitting us to make use of their libraries and to photograph illustrations in their possession the following persons have been of great help to us: Mr. Hugo Freed of the Arthur Freed Orchid Co.; Mr. Leo Holguin of the Armacost & Royston Co.; Mr. Roy J. Scott of the R. J. Scott Orchids and last but not least Mrs. Lillian Gold, Editor of the O.S.S.C. Review. To all of them we would like to offer our thanks. In addition to the above and our own libraries we have also made use of the University of California, at Los Angeles, Department of Agriculture Library.

## II. DESCRIPTION

The genus *Cynoches* consists of epiphytic or terrestrial herbs (2, 3, 5, 22, 23, 33, 35, 41, 95 and others with fleshy (64), sturdy (88) elongated fusiform — cylindrical (5) or cylindrical but slightly

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undulated pseudobulbs which taper near the apex (2,3). They have been described by some as cigar (88) or club (78) shaped. The pseudobulbs vary greatly in length and may be between 4 inches (30, 35) and 3 feet (18, 45). Bulb lengths of 12 inches (31, 35, 89), 5 inches (16), 9 inches (21), 32 inches (30), 2 feet (21), 14 inches (30), 24 inches (36), 8 inches (16, 30, 33) and 30 inches (59) have been reported or recorded. The bulbs on our plants are about 14 inches in length.

The pseudobulbs are sheathed by few to many satiny (62) plicate-membranous leaves (2, 3, 5, 95 and others) which are arranged alternately (2, 3). The number of leaves on some plants has been reported as being 6 to 7 (62); we have counted 13 leaves on one of our plants. The leaves are acute to acuminate in shape (2, 3) may be 10 inches to one foot or more in length (18, 22, 31) and 6 inches in width (18). One of our plants bore a leaf seven and one half inches wide and 34 and one quarter inches long. The leaves are deciduous and drop in the fall.

The inflorescence is lateral, usually originating from the nodes of the bulb or from the leaf axils near the top (2, 3, 5). As a rule the raceme is not branching and may be erect, arching or pendulous (2, 3, 95). It may be rather short (33) or 8 to 12 inches in length (89) and carry 2 to 12 flowers (22, 23, 33, 35, 43, 45). A plant may produce 1 to 4 racemes per year, bloom up to 3 times per year (59) with a total of about 15 to 20 (30, 50) or as high as 27 flowers (59). Inflorescences may be all staminate (male), all pistillate (female) (2) and occasionally mixed (16). A plant may carry two or more racemes at the same time, some male and some female (42) or produce male flowers one year and female the next. The factor determining the sex of the flowers is not known at present.

Male and female flowers are fleshy, similar in shape and differ from each other mainly in the structure of the column (2), with both sexes having their flowers borne "upside down" (61). Flower size may be 4 - 6 inches (1, 16, 28, 29, 42).

In some cases the flowers may be very fragrant (1, 42, 61, 92) especially during the late hours of the morning (30, 62) a few days after having opened. The female flowers are reported as having a more delightful fragrance than the males (30). In some instances however, the fragrance may be totally absent (78).

Flower color has been described as golden yellow, greenish yellow, shaded with pale apple green (6, 18), chartreuse green (1), yellowish green (7, 28, 29), dark green (92), golden green (55) and all shades of green (96).

Allen (2) describes the staminate flowers as having subequal, free, spreading yellowish green sepals with the dorsal sepal being erect, lanceolate, acute, concave about 3 and  $\frac{3}{4}$  to 4 and  $\frac{1}{2}$  inches long and about  $\frac{5}{8}$ - $\frac{6}{8}$  inches wide. The lateral sepals are spreading, lanceolate, acute, about  $\frac{5}{8}$  of an inch wide and 2 and  $\frac{1}{2}$  - 3 inches long. The petals are elliptic lanceolate, acute, yellowish-green and spreading and their size  $2\frac{3}{4}$  -  $3\frac{1}{4}$  by  $\frac{3}{4}$  - 1 inches. The lip is entire (28), fleshy, sessile or nearly so, elliptic, lanceolate acute and convex toward the middle, and

its length is about  $2 \frac{2}{5}$  -  $2 \frac{3}{5}$  inches. It is lighter in color than the rest of the flower (29) and may even be ivory white (18); it has a dark green ovate obtuse depression below the projecting, nearly triangular callus. The column is terrete, elongate, strongly arcuate,  $1 \frac{1}{8}$  -  $1 \frac{1}{2}$  inches long (2, 18) with the apex swollen to a prominent knob (31). It contains normal operculate 1-celled or imperfectly 2-celled anthers (18, 95) and paired waxy ovoid pollinia (2, 18, 95) which may be easily removed (30) or be ejected to a distance of one inch and adhere to various objects (34). When the pollinia are removed, ejected or even slightly disturbed the flower will rapidly wither and die (63); the flowers should therefore be handled with utmost care if they are to last any length of time.

The pistillate flowers are produced less frequently than the staminate, but resemble them in shape and at times may be smaller (54). The main difference between the two sexes is in the column which in the female flower is short and squat, with two fleshy, triangular wings at the notched apex and contains stigmatic surface and no pollinia (2, 15, 18, 67). The column of the female flower may be half as long as the male column and about four times as thick (15). The ovary is stout, twice, as thick as the pedicel of the male flower and strongly grooved (15).

The existence of hemaphroditic flowers is open to question. Allen (2) states that they do not occur while Hawkes and others (30, 45) report the existence of a sterile hemaphroditic flower.

The pollination of *Cycnoches* has been studied both by Darwin (34) and Allen (2). The latter describes in detail his observations on *C. ventricosum* var. *Warszewiczii* which were made in Palmar, Costa Rica. One may suspect that *C. ventricosum* var. *chlorochilon* may be pollinated in a similar manner. Feeding insects dislodge the pollinia which spring out and attach themselves to the insect. The insect eventually transports the pollinia to a pistillate flower where they are caught by the apical notches of the pistillate column and retained. These notches play a very important role in the process of pollination since the stigmatic surface is not sticky as in other orchids (2). This system of pollination is apparently a successful one since the species is widespread.

On March 1896 a seed capsule of *Cycnoches ventricosum* var. *chlorochilon* was received at Kew. After it was drawn it was submitted to Dr. Scott at the Jordell laboratory "with a view of ascertaining the approximate seed number". Dr. Scott weighed a small number of seeds, counted them, then weighed the rest of the seed and thus arrived at some very interesting figures which were published in the Kew Bulletin during the year of 1909. The weight of a single seed is 0.0000036 gram (there are about 450 grams per lb) and there are 300,000 seeds per gram. He thus arrived at the figure of 3,770,000 seeds for the pod. If one is to account for some seeds probably lost during the manipulations the figure would probably be 4,000,000 or close to it. The size of the capsule is given as 6 inches by 2 inches. The story has been told and retold, quoted and requoted in several

papers from which we have attempted to reassemble it since we did not have access to the Kew Bulletin in question. Rolfe considers this large number of seeds as an indication of a higher form (71).

### III. CLASSIFICATION AND NOMENCLATURE

The genus *Cycnoches* was established by John Lindley in 1832 from a plant sent from Surinam to Messrs. Loddiges in England. Two separate Greek words were used in coining the name, *kyknos* meaning swan and *auchen* meaning neck. The name refers to the swan neck. The name refers to the swan neck shape of the colum (Figs. 2, 3, 4, 6).

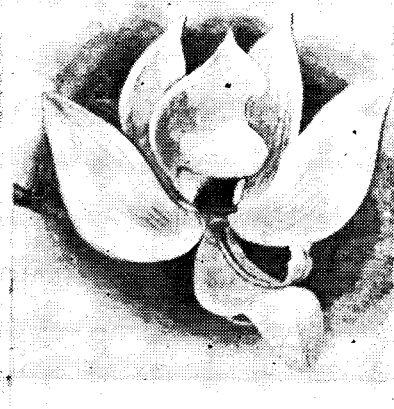
The number of species in the genus has been placed at 60 by Thomale (82), 50 by Moore (60) 2 dozen by Hawkes (45), 16 by Schlechter in 1916 (18), one dozen approximately by Bailey (23), Merked (59) and Watson and Bean (89) and only seven by others (21). In his revision of the genus Allen (2) lists seven distinct species with two of the species having two naturally occurring varieties each, a total of 11 different entities. Part of Allen's key is based only on the staminate flowers since the pistillate flowers are very similar in most species.

*Cycnoches* the genus is related to the other fleshy stemmed Orchidaceae such as *Catasetum*, *Mormodes* and *Cyrtopodium* (64). It has been described as related to *Stanhopea* (31), related or allied to *Catasetum* (16, 40, 45) and close to *Mormodes* (16). The genus has been placed in the tribe Vandae (33, 34, 52, 65, 76, 93), Sub Tribe *Catasetae* (34), or the Sub Tribe *Stanhopeae* (33, 52, 76, 93) and also in the *Catasetinae* group (82). Reichenbach, the son, placed the genus *Cycnoches* in the group *Eborilingues* (80). Pfitzer has assigned the genus to *Monandrae*, *Acrotonae*, *Pleuranthae*, *Homoblastae* and *Catasetinae* (80). Schweinfurth (81) as well as Dunsterville and Garay (38) have classified the genus as belonging to the Subfamily *Monandrae*, Tribe *Kerosphaerae*, Series *Pleuranthae*, Subseries *Sympodiales* and Subtribe *Catasetae*. The latest attempt at classification is by Dressler and Dodson who have assigned *Cycnoches* to the Subtribe *Catasetinae* which in turn they place in the tribe *Epidendreae* (39).

Two distinct subgeneric group are easily distinguished within the genus, the *Eucycnoches* in which the staminate (male) and pistillate (female) flowers are very much alike; and the *Heteranthae* in which the staminate and pistillate flowers are dissimilar. The identification and determination of species within the genus has been very difficult and subject to much confusion and many errors because of the dimorphism of the flowers (73, 74). In addition, the ease with which pollinia are removed from the flowers adds to the difficulties involved in the recognition of species (30, 34).

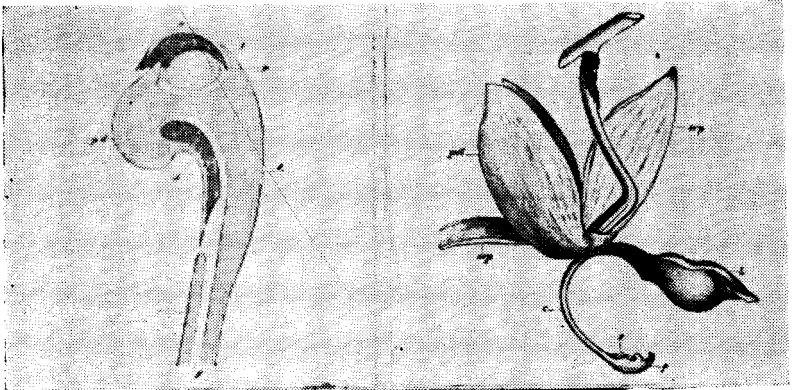
These errors have been discussed at length by Bateman, Rolfe (67, 70, 72, 73, 74) and Allen (2).

A plant collected by Ure-Skinner in Guatemala bloomed in Bateman's collection in 1837 and was described by him in that same year in his *Orch. Mexico and Guatemala* t. 5. He named the species *Cycnoches ventricosum* (70, 74). In 1836 Moritz collected, in Mara-



#### EXPLANATION

1. *CYCNOCHES VENTRICOSUM* var. *CHLOROCHILON* in bloom. UCLA Greenhouses
2. Photograph of an illustration in the *Orchid Album* vol. 6(87) (upper right).
3. Photograph of a line drawing in the *Orchid Growers Manual* 4th ed(92). (An attempt by an artist to improve nature who has "corrected" the position of the flower. (Lower left).  
the flower. (Lower left).
4. From the *Flower Grower's Guide*(99). (Lower right).



5. Column. From Darwin(34). (Upper left).

- a. anther
- f. filament of anther
- p. pollen mass
- pd. pedicel of pollinia barely separated as yet from the rostellum
- d. disc of pollinia
- s. stigmatic chamber
- g. stigmatic canal

6. Whole Flower. From Darwin(34). (Upper right).

- c. colum after ejection of pollinia together with anther
- f. filament of anther
- s. stigmatic cavity
- L. labelum
- pet. two lateral petals
- sep. sepal

7. Close up of flower on spike of fig. 1 (Lower).

caibo, Venezuela, and sent to the Berlin Museum a *Cycnoches* plant which upon blooming was described in 1837 (70) or 1838-1839 (72) by Klotzsch in *Otto und Dietrich Allgemeine Gartenzeitung* VI p. 225. He names this species *Cycnoches chlorochilon* (72, 87). The same species was imported to England in 1838 by Loddiges from Demerara and upon blooming was figured by Lindley in *Sertum Orchidearum* t 16. The first female flower of *Cycnoches chlorochilon* was recorded in 1891 in the collection of M. Houzeau in Belgium; later another female flower was observed at Sander's (70). Some years later, in the same collection a plant from Caracas produced both a male and a female flower and thus the connection between the two different flower shapes became evident. Since the male and female flowers of *C. chlorochilon* are very much alike as are the flowers of *C. ventricosum* the two species have been placed in the subgeneric group *Eucycnoches*.

Allen (2) in his revision of the genus has maintained the species *C. ventricosum* Batem and has placed *C. chlorochilon* Klotz. in it as a naturally occurring variety, hence the name we are using as the title for this article. Williams (95) has advanced the question of *C. ventricosum* Batem. being the female of *C. stelliferum* Lodd.

On one occasion in 1845 the name *Cycnauken Lemaine* seems to have been used.

The common names of *C. ventricosum* var. *chlorochilon* are Green Swan Orchid (1), Swan Orchid (2, 14, 18, 22, 31, 35, 43, 50, 55, 61, 63, 78) and Swan's Neck Orchid (23, 33, 77, 96). Because of these common names *C. ventricosum* var. *chlorochilon* has been reported as being very popular in the 1930 Chelsea show (14). The opinion of the writer reporting the show (14) is that this popularity may have been due to the expectations of the show visitors to see a swan like plant.

#### IV. HABITAT AND AREAS OF CULTIVATION

*C. ventricosum* var. *chlorochilon* is listed as native to Central America (5, 21, 22, 28, 33, 41, 42, 59, 61) Northern South America (21) and Tropical America (22, 29, 45). Some give its distribution as being from Mexico to Peru and Brazil (3, 18).

It is to be found in Mexico (5, 18, 95); in Guatemala at elevations of up to about 2 miles (2, 5, 70, 74); British Honduras and Costa Rica (5, 11, 30, 45). In the Republic of Panama (5, 18, 35, 37, 43, 45, 46, 55, 78, 84) it can be found in the Pacific lowlands, the Eastern half of the republic (3), in Darien Province at elevations of 2000 feet and up (24), and on Macano trees in the Province of Chiriqui at 2000 feet altitude (30, 35, 36). Colombia is also a homeland to the species (16, 18, 28, 30, 41, 45, 50, 59, 77, 82, 96) as is Venezuela (18, 23, 28, 31, 41, 50, 54, 59, 82, 94, 96) where it has been observed on Calimbo trees near Valencia at an elevation of 1500 ft. (58, 59, 60). *C. ventricosum* var. *chlorochilon* is also native to British Guiana (18, 28, 29, 31, 52, 56, 59, 87, 92), Peru (3, 18) and Brazil (31, 45).

While it may be cultivated in many countries we have seen *C. ventricosum* var. *chlorochilon* listed as cultivated and doing well in Belgium (67); England (7, 8, 14, 86, 101, 102) in spite of a small setback in the vigor of plants around 1925 (12); in Northern and Southern California (25, 47, 48, 97); in Oregon (83) and New Mexico (85).

## V. HYBRIDS AND VARIETIES

It appears that few growers have attempted to select varieties of *C. ventricosum* var. *chlorochilon* and name them. We have noted only two such varieties. *Cycnoches chlorochilon* variety Goliath by Stuart Low was awarded an F. C. C. on Oct. 22, 1957 (101) and *C. chlorochilon* variety Galderstones which won an A. M. when shown by the city of Liverpool Parks Department on Nov. 5, 1957.

We have encountered no mention anywhere of interspecific varieties or intraspecific crosses of *Cycnoches*. A cross between "species belonging to the genera *Cycnoches* and *Catasetum*" is reported to have produced viable seed which developed into seedlings and then perished, apparently because of improper growing conditions (53). We ran across no other mention of any crosses involving the species.

## VI. METHODS OF CULTIVATION

*C. ventricosum* var. *chlorochilon* is an easy species to grow, but it has certain requirements which growers hoping for success should try to fulfil. The more general suggestions are that this species be treated like *Vanda* and *Phlaenopsis* (88, 96); be placed in an East India house (92), preferably in its coolest end (87, 93); receive the same treatment as *Calanthe* (82); *Stanhopea* (33); *Catasetum* (40, 54, 63, 91) or be grown in a *Cattleya* house (18, 87) preferably with a little less light (62).

*Temperature.* It has been the experience of growers in the past that *Cycnoches* needs warmth (27) and the stove house has been suggested as appropriate for its cultivation (7, 32) with the hottest end being preferred by some (100). Others suggest a "hot" house (96), a warm house (9, 23, 26, 28, 54) or even the "warmest house" (16). The intermediate house also has a proponent (55). The more specific recommendations for night temperature are 60-65° F. (41); 62°-65° F. (41); 60° F. (55), and 65° F. for winter nights and 70° F. for summer nights. The suggested minimum night temperature is 60° F. (88). The daytime temperatures should be about 10° F. higher than the night temperatures. The recommendations are: 70° F. (55); 80° F. (58); 80°-85° F. (41, 43). For summer days 70°-80° F. may be preferable and 70° F. for winter days.

In our greenhouse the minimum has been 58° F. for a few nights, but the temperature is generally kept around 63°-66° F. During the day the temperatures are around 80°-85° F. but occasionally may go up as high as 90° F. or even higher for short periods. The plants do well under these conditions.



There is no information available on the effect of temperature on flower initiation and development.

*Light.* In nature *C. ventricosum* var. *chlorochilon* has been observed growing in full sun (35, 36) and in semi-shaded forest areas under filtered light and sun throughout the day. In cultivation the species has been grown under a variety of conditions. Partial shade is preferred by some (26) as are "half shade" (59), "heavy shade" during growth (76), and "less light than *Cattleya*" (62). Lots of light is favored by other growers (60, 92) while still others recommend all light possible but no direct sun (87) or just a "light position" (89). More specific recommendations vary from 200-400 foot candles (43) to 1000-3000 foot candles (41) or 15-20% of outdoor sun light. In our greenhouse the light intensity is about 5000 foot candles and the plants grow well under it.

As is the case with temperature no information is available on the effect of light intensity, duration and quality on flower initiation, sex and development. When more information on the subject becomes available growers may be able to control blooming of this species by means of light and/or temperature variations.

*Growing Media and Containers.* In nature *C. ventricosum* var. *chlorochilon* has been observed growing on the rough and spongy bark of the Macano tree (35, 36); on large trees about 20 feet from the ground (5, 44, 59); on decaying or rotten tree stumps (5, 44) and on unpainted lumber used for gates and fences (11).

When grown in greenhouses the Swan Orchid has been planted in well drained baskets (45, 90); at times suspended (63); or in pots (90, 93) and placed on greenhouse benches. Among potting media "*Cattleya* compost" has been suggested (16) as well as *Osmunda* fiber (35, 88); fibrous peat (31, 92, 93); "fibre with little sphagnum and an addition of well dried dung" (31). Other media used are: fibrous peat with broken leaves (32); fibrous peat with sphagnum and silver sand (90); 4 parts fairly fibrous loam, 1 part sand, 1 part leaf mold and finely chopped sphagnum (76); peat and sphagnum (26, 87); fibrous peat with sphagnum, a little loam fibre and silver sand (89); *Osmunda* with sphagnum (41, 82); 1 part *Osmunda*, 1 part sphagnum, and 1 part peat moss (41); pure sphagnum (27); sphagnum moss and peat (27); and brown *Osmunda* with charcoal and broken rock (59).

As a potting medium we use fir bark to which only dolomitic lime stone has been added. Our containers are clay pots. No comparative studies have been made to show which of the numerous potting media used or what containers are to be preferred.

*Watering and Humidity.* A study of the precipitation in the areas where the Green Swan Orchid is native will result in a better understanding of its true requirements. In some areas of Venezuela plants may be drenched daily by rain (59) while in other areas humidity is almost always high. Recommendations for watering are varied. Some growers recommends "ample" water (16) and other "little" water especially during the resting period (26). Over-watering should be avoided (27) according to some while others claim that "liberal"

watering is the proper watering requirement (32). "Twice daily (35) and "copious" water are also considered proper (60).

Terms such as "lots of water" (43), "more water than *Catasetum*" (54), "do not keep dry when growing (62), and "water carefully" (76) are used by some writer to indicate watering practices and requirements. Needless to say, these terms are unspecific and offer no help to the grower and could have just as well been omitted from their respective papers. They are offered here merely because they may have some limited value when combined with the other information presented in this paper.

*Cycnoches* is sensitive to root-rots, hence good drainage is essential (27, 31, 41, 45, 57, 87, 90, 92, 93). During very hot weather some authors suggest a light syringing as being of possible benefit (78), but care should be taken to prevent water from lodging in the young growth since this may cause rot (16, 89). In cases where it may present serious problems syringing is not recommended (59, 100). One writer (17) suggests that water be withheld when the flower buds are large and just opening, another writer however suggests the exact opposite (59), but all agree that heavy watering is required during the time the plant is in bloom. There seems also a generally agreed practice to reduce watering during the rest period (26, 28, 32, 59, 62, 63, 76).

The atmosphere should be "highly saturated" (100), "very humid" or at least "moderately humid" with a relative humidity of 65%. One suggestion is that *Cycnoches* can stand less humidity than *Catasetum* (54), however no details are given as to how much humidity *Catasetum* can stand.

We water our plants 3 times a week filling the pot with water to the brim, the excess water running out thru the botom of the pot leaching the pot thoroughly. During the rest period our watering is reduced to 1 - 2 times a week depending on the temperature and sun outside. The relative humidity is 75% at all times.

As with light and temperature more positive answers could be given on watering and humidity only after careful experimentation under well controlled conditions.

*Fertilization.* An occasional watering with dilute steer manure is suggested (35) as is feeding with Hyponex and Wilson's Orchid Fertilizer (59). One author recommends lots of feeding (78), another, light feeding (88), none bothers to give exact recommendations.

We fertilize our plants with every watering by alternating 1 lb. of Mono Ammonium Phosphate, Potassium Nitrate, Ammonium Nitrate and Calcium Nitrate per 100 gal. of water (51). One can also use 1 lb. of Golden or Instant Vigoro per 100 gal of water with every watering as well as any of the numerous "Orchid Food" formulas on the market.

*Rest.* A period of apparent lack of activity by the plant is referred to by most writers as the rest period. During this period it is suggested that watering, feedings, light, humidity and temperature be reduced (26, 28, 32, 62, 63, 76).

*Repoting.* When a plant outgrow its container it is time to repot and or divide it. The best time for this appears to be at the start of

new growth from the bulbs (92, 93). It may be advisable to tie *Osunda* around the new growth so that the roots may develop better. Once the roots have developed the new growth may be severed and reotted (59). Diseased, rotting or rotted bulbs should be removed. In some cases vegetative shoots can develop from the flowering stem, these may be rooted and grown to blooming size plants (59).

## VII. PESTS AND DISEASES

*Cycnoches* is very sensitive to red spider (88) with Malathion being suggested as an effective means of control (49). Our plants were severely attacked in 1960 and we found that Malathion alone is not nearly as effective as a combination of Lindane, DDT, Malathion and Tedion marketed under the trade name ISOTOX. We also found Diazinon to be effective. In all cases the instructions on the label are to be followed. Three weeks to a month of a very rigid spraying schedule were required before the pests were brought under control.

Snails and slugs may chew on the flowers and leaves. A Metaldehyde containing bait (Cooke brand) has proved most effective for us if used as directed on the label. Diazinon drenches, using 1 part Diazinon to 400 parts of water, may also be used. The best remedy has been, and still is, collecting the pests. It is second only to prevention.

Various rots are the diseases one has to cope with. Proper (GOOD) drainage and judicious use of water will prevent most rots.

Improperly painted glass (uneven spread of the paint permitting too much light in some areas) may result in serious sun burn damage. Care should therefore be exercised in white washing the glass. The paint should be evenly spread.

## VIII. SUMMARY AND CONCLUSION

*Cycnoches ventricosum* var. *chlorochilon* is probably one of the most beautiful orchids in existence. With the proper knowledge and understanding of its requirements and needs it is an easy species to grow.

It requires a minimum night temperature of 60° F. and may stand a maximum temperature of up to 90° F.

The relative humidity in the greenhouse should be around 75%.

Light intensity should be between 2000 and 3000 foot candles and may go up to 5000 foot candles without any damage to the plants.

Plenty of water and fertilizers round out the requirements.

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