# Clivia News

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**Clivia News**

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# Contents



## INSIDE

# From the Editor

This is the first Clivia News edition for the 2022 year. We are in search of a new Editor to take over from Glynn. The digital age is here, so we should take advantage of the benefits that it offers us. The distribution of the publications is so much quicker, easier and less expensive if we use the digital format. We are well aware that not everyone enjoys a digital copy, doesn't have a computer or may not have access to the internet. These problems can be solved. If the affiliation fee for the Society can be reduced, perhaps the Clubs can reduce their membership fees.

The challenge for the Editor remains the lack of articles. Perhaps, most of what needs to be said about *Clivia*, has already been documented. Fortunately, everyone likes images of *Clivia*, so I am able to provide pretty *Clivia* photographs from the Society 'Virtual' Show. I have included the second and third positions of the 'miniata part' of that show. I will include the species and interspecific second and third places in the next edition.

Please remember that the Yearbook will be published in hard copy at the end of the year.

Looking through the articles of the earlier editions of the Clivia News and Clivia Yearbooks provides a large body of knowledge which I am sure most members are unaware of or have forgotten about.

This edition includes two previously published articles – one technical and now edited to hopefully help with understanding the article and one on the importance of light in growing clivias.

Glynn looks at the reasons why club memberships numbers may be decreasing. Chris de Vry relates to us the breeding of 'Super Stripes' by Pine Pienaar.

Helen Sanders continues to be a loyal supporter of ours with her 'Clivi-Arta' cartoon.

*Glynn Middlewick*

COVER: Original 'Super Stripes' image

BACK COVER: Apricot/Salmon entry of Carrie Kruger

ERRATUM: The winner of the 'Splash' Class of the Clivia Society 'Virtual' Show 2021 is Stefan Ferreira-apologies for the error.

Clivia Society 'Virtual' Show – Splash Class – winner Stefan Ferreira

# From the Chair

A New Year has arrived and hopefully there will be light at the end of our Covid tunnel

All citizens have gone through difficult times, some more than others. Resistance to vaccination, particularly if you have co-morbidities or advanced age, with benefits far outwaying the risks, makes no sense to me.

The holding of physical meetings will hopefully be more regular this year.

The Society's 'Virtual' Show runs from the 1st of February until the 14th of October 2022. This event has proved to be popular with members and provides an international flavour for the Show. Please support this Show and enter your images. A request to limit the size of your entries to 1MB or 2MB maximum has been made to me. This edition provides details of the classes and the requirements for qualification of entries. ('@' is the symbol to be included with your photographs).

The Annual General Meeting takes place in May this year. The venue is the Durban Botanical Gardens. All the positions on the Executive Committee are open for re-election. The position of Editor is vacant. This is an important position in the Society as the publications provide a common bond amongst the clivia members from the various geographical areas. Provision of suitable articles remains a problem, but we are fortunate to have superb photographs of breeding developments in clivia flowers.

To provide updates for the various members locally and internationally, we plan to have Zoom Sessions, monthly, if necessary, to keep everyone aware of developments. Our first Zoom session takes place in February and will involve mainly the contacts of the various clubs. We aim to hold these sessions on the second weekend of each month. Times will vary to accommodate international representatives.

*Glynn Middlewick*

# The role played by the various elements of nutrition in the life, growth and health of plants

**Marc Vissers - Belgium**

*[This article is a summary of a previously published article)*

## 1. INTRODUCTION

Many symptoms of stress are seen in pot plants. While problems may arise due to water spray damage, sunburn, desiccation, cold or frost or physiological effects, the most common cause is a either a surplus or a deficiency of a specific nutrient.

Some understanding is necessary for one to gain a better insight into nutrition and the problems that arise from a surplus or deficiency in specific nutrients.

## 2. THEORETICAL BACKGROUND TO THE VARIOUS ELEMENTS

### IMPORTANT PLANT MATTER, MOLECULES AND ELEMENTS

Plants consist of 90% water and 10% dry matter. The dry matter can be divided into organic and inorganic materials.

The greatest portion consists of complicated organic compounds which are formed from Carbon, Hydrogen and Oxygen. These elements make up together 94% of the dry matter in plants. They are synthesized from water, (from the soil) and carbon dioxide, (from the air.)

The inorganic materials make up only 6% of the dry matter. The most important element of these is Nitrogen, that occurs in the living plant material. Sulphur is also an essential constituent of proteins. But after these, Magnesium and Iron (leaf formation), Calcium and Potassium (cell membranes) and Phosphate (energy storing and release) are absolutely essential for complete plant development. These are the major elements.

All these elements must either be present in the soil or must be supplied through fertilization.

### PLANT CONSTITUENTS:

#### Protein molecules

*Importance:*

The dry matter of the living part of every cell consists especially of proteins. These proteins are essential components of the living organism.

Absorbed nitrate, sulphate and carbon are converted to form proteins. The important elements for this conversion are Manganese and Molybdenum.

#### Sugars

important energy sources for plants which are produced during photosynthesis (trapping of photoenergy). This energy is necessary for all life processes in the plant,

Sugars are essential to the plant for the construction of cell structures.

Sugars are formed from Carbon, Hydrogen, and Oxygen and accordingly are also known as carbohydrates.

*Promoting elements:*

- Magnesium and Manganese are constituents of enzymes that regulate carbohydrate metabolism
- Boron not only is involved in sugar synthesis but also in transport of nutrients to the growth points, fruits and leaf nodes, ....

#### Fats

Fats occur in the cytoplasm of plant cells. On one side they serve as an energy source when too few sugars are available and form an important part of the cell wall.

Some lipids can also determine the colour of plant parts, for example carotenoids.

#### Chlorophyll

This molecule belongs to the group of pigments and consequently results in the colour of plants; more specifically, chlorophyll a is responsible for the green colour of plants. Furthermore, chlorophyll is of crucial importance for photosynthesis. It can absorb light energy.

The chlorophyll molecule is composed of Carbon, Hydrogen, Oxygen, Nitrogen, and Magnesium. Magnesium is the central element and a deficiency of Magnesium or Nitrogen manifests itself immediately as a lighter green plant colour.

In the formation of chlorophyll, Iron is also important because Iron is a constituent of the enzymes that stimulate the formation of the pigment.

**ADP- and ATP-molecules**

The molecule ATP (Adenosine Triphosphate) is responsible for the trapping of light energy (photo-synthesis) and for the energy transport in the plant (ATP is released during respiration).

These molecules are composed of the elements Carbon, hydrogen, oxygen, nitrogen and phosphate.

**RNA-and DNA-molecules**

= ribonucleic acid and desoxyribonucleic acid

These molecules determine the genetic structure of every plant: every plant has a different DNA composition. These molecules are made of carbon, hydrogen, oxygen, nitrogen and phosphate. Magnesium and Boron are important constituents for RNA enzymes and nucleic acids.

**Hormones**

*Importance*

Various hormones within the plant as growth and flowering regulators. Their components are carbon, hydrogen, oxygen, nitrogen and chloride, with Zinc, Boron and Molybdenum playing an important role.

**Cell Sap**

The most important element in the cell sap is potassium, which is not incorporated in the plant molecules structures. It thus accounts for a great deal of the salt concentration and consequently the osmotic pressure of the cell sap (together with the other ions in solution), and it is hereby very important amongst other things for the water balance of plants. Nitrates and chlorides also play a major role in osmoregulation.

The most important element in the cell wall is Calcium.

From the summary above, the enormous importance of the elements Carbon, Hydrogen and Oxygen and Nitrogen that are found in all plant molecules is apparent.

**General**

The plant uses solar energy to synthesize sugars from primary materials, water and Carbon Dioxide. (photosynthesis = trapping of solar energy and sugar synthesis).

Everything that lives must respire, also the plant. The synthesized sugars serve this purpose. During respiration they are broken down and the plant gains energy for its activities, such as plant development, chemical reactions in the plant, heat maintenance.

(respiration = breakdown of photosynthesized sugars with the release of chemical energy).

Not all sugars formed during photosynthesis are consumed in respiration. The surplus sugars (residual sugar) can be used for increasing dry material and thus growth. During growth the plant produces more sugar than it uses (growth = conversion of residual sugar to new plant molecules

For rapid growth a great deal of photosynthesis (sugar formation) and respiration (sugar break-down but energy production) must occur. Photosynthesis occurs only in the presence of light (thus during the day) and only in the green parts of the plant. Respiration processes take place day and night in the whole of the plant.

Consequently, for growth to occur there must be more photosynthesis than respiration. It is therefore important to accelerate photosynthesis by providing higher temperatures during the day (primarily for photosynthesis) than in the night (for only respiration).

SUMMARY OF VARIOUS LIFE PROCESSES IN THE PLANT

Photosynthesis: Conversion of light energy into chemical energy and sugar formation.

When and in what parts of the plant does photo-synthesis occur:

Plants photosynthesize only by day or with artificial illumination.

Photosynthesis only occurs in the green parts of plants with large surfaces (especially leaves),

- to a lesser extent in green parts with a smaller surface (thick plant parts, or yellow / patchy No photosynthesis takes place in the roots and other non-green parts – flowers.

Distribution of sugars to the roots and other non-green parts is consequently necessary.

SUMMARY OF COMPONENTS AND COMPOSITION OF PLANTS

Table 1 below presents a collective summary of the different plant molecules or elements discussed.

| Important components and molecules (promote formation) | Constituent elements | Anabolic elements |
|---|---|---|
| 1. Proteins, Enzymes | C, H, O, N, S, (P) | Mn, Mo |
| 2. Polysaccharides, Sugars | C,H, 0 | Mg, Mn, B |
| 3. Fats, Oils, Lipids | C, H, O, P | Fe |
| 4. Chlorophyll, Green leaf pigment | Mg, C, H, O, N | Polyvalent elements |
| 5. ATP | C H, O, N, P | Mg,B |
| 6. DNA | C H, O, N, P | Zn, Mo |
| 7. Hormones | C, H, O, (N, Cl) | |
| 8. Enzyme activators and Coenzymes | $Mn^{++}$, $Co^{++}$, $Mg^{++}$, $Zn^{++}$, $Mo^{6+}$, $Ni^{++}$ Fe, Cu, Mn, Mo | |
| 9. Polyvalent elements | Fe, Cu, Mn, Mo | |
| 10. Most important ion(s) in cell sap | $K^+$, ($N0_3$", Cl") | |
| 11. Most important element(s) in cell wall | Ca (P, C, H, O, Mg, B) | |

**Respiration:**

Conversion of various energy rich compounds (sugars and fats) to energy-poor compounds, with release chemical energy.

This energy can be used by the plant for:

chemical activity (reactions) mechanical activity

heat regulation in the plant

Plant respiration takes place both by day and by night.

Respiration occurs in all parts of the plant. Both green and non-green sections use energy for their growth and consequently must respire (= energy release). Deficient sugar synthesis or transfer will result in much faster growth retardation or die-off in the non-green sections.

## 3. FUNCTIONS OF THE ELEMENTS (Table 2)

The majority of elements have multiple functions in the plant. Table 2 presents a condensed summary of the important functions by element.

## 4. SYMPTOMS OF DEFICENCY AND SURPLUS, + RISK FACTORS (Table 3)

For the cultivator it is in the first place interesting and important to know whether the plant has either a deficiency or a surplus problem. Therefore, we compiled a summary in which we present per element how the nutrition problems are manifested and where on the plant they occur. Together with this the risk factors are presented.

A possible rule-of-thumb for deficiency effects is the following:

- the major component elements N, P, K and Mg are very mobile in the plant and appear first in the older leaves! This applies also to $Mn^+$.
- the trace element deficiency as well as the calcium deficiency are seen mostly in the younger leaves.
- surplus effects are seen mostly in younger leaves; this is accompanied by a secondary calcium-, iron- or magnesium deficiency. Occasional B, Cl, Mn surplus is seen mostly in older leaves.

## 5. KEY FOR RECOGNITION OF NUTRITION ABERRATIONS (Table 4)

To simplify the diagnosis we have compiled a recognition key that depicts stepwise each nutrition problem that may be encountered. We start in the first instance with the whole effect one sees (leaf edges or total leaf colour) and look thereafter in which leaves the effect occurs (young or old). As a third direction indicator we take the potting soil pH to see if it can explains the possible cause and in the event that the pH can be measured by the cultivator himself.

One then has an indication of the possible cause pending the results of laboratory analysis of the leaf.

| ELEMENT | FUNCTION IN THE PLANT |
|---|---|
| Nitrogen (N) | quantitatively the most important element, especially important during the vegetative growth phase the most important constituent of living plant material, namely proteins and enzymes constituent of leaf green (chlorophyll molecule) and thereby responsible for the green plant colour and photosynthesis constituent of DNA (genetic material), vitamins, ATP (energy transport), .... Nitrates play a part in osmoregulation |
| Phosphorus (P) | especially important during rooting, also after flowering when more phosphorus is necessary P is a constituent of the most important energy transporter in the cell, namely the ATP molecule (without energy no life processes in the plant!) P forms strong bonds with C atoms (C-P-C bonds): these are important in the structure of the cell wall, and of the DNA molecules P is also a constituent of some proteins, and of importance for the formation of some enzymes |
| Potassium (K) | together with N quantitatively the most important element, especially important for flowering.<br>K is the principal element that determines the strength and porosity of the cell wall, and gives resistance to adverse conditions<br>K has a regulating function in maintenance of water balance: it controls the osmotic pressure of the cell sap and the opening and closing of the stomata<br>K provides a better utilization of light energy during photosynthesis, and makes possible the transport of the synthesized sugars in the plant many enzymes function only in the presence of K |
| Magnesium (Mg) | Mg is the central atom in the chlorophyll molecule (leaf green), and thereby is essential for photosynthesis and therewith for the green leaf colour Mg is of importance for internal ion- and energy transport; it promotes the mobility of phosphates, so also that of the ATP molecule.<br>Mg is part of enzymes acting as intermediaries in the carbohydrate cycle. A deficiency of Mg results in a sugar deficiency and this manifests itself in the non-green portions (such as roots and fruits, with consequent root inhibition) |
| Calcium (Ca) | Ca is very important for the structure and porosity of the cell walls<br>Ca stimulates a limited number of enzymes, inter alia those functioning as intermediaries in respiration (= energy release) |
| Iron (Fe) | Fe stimulates some intermediary enzymes in the synthesis of chlorophyll, and is thereby indirectly of importance for photosynthesis<br>Fe is one polyvalent ion that can switch valency ($2^+$ and $3^+$). Thereby the element is involved in electron transport during photosynthesis<br>Fe is important for root meristem growth |
| Manganese (Mn) | Mn is like Fe a polyvalent ion that can switch valency ($2^+$ and $3^+$). Thereby it is involved in electron transport that occurs in photosynthesis<br>Mn activates various intermediary enzymes in protein synthesis (it promotes nitrate reduction and the conversion of nitrites in amino acids<br>Mn deficiency raises nitrate levels in the leaves just as Mg, Mn also forms part of enzymes that control carbohydrate metabolism; a Mn deficiency results in a sugar deficiency in the roots<br>Mn also activates the enzyme that breaks down IAA |

| ELEMENT | FUNCTION IN THE PLANT |
|---|---|
| Boron (B) | B is directly involved in the synthesis of the enzyme that controls cell division, it inhibits the breakdown of the growth hormone IAA, and is thereby extremely important for root formation and the activity of the growth points<br>B is essential for healthy cell walls; it stabilises cell wall structures, stimulates wood formation and thereby *inter alia* is responsible for increased resistance, e.g. frost resistance of fruit.<br>B is responsible for starch as well as sugar synthesis in sugar transport (via phloem to the growth points *inter alia*)', thereby it increases the sugar content of fruits and tubers.<br>B stimulates the growth of tubers, flower- and pollen production, promotes the fertility of pollen,<br>B is also important in the synthesis of nucleic acids (RNA, DNA) |
| Molybdenum (Mo) | Mo activates 2 enzymes that are responsible for nitrate incorporation (- nitrate reduction) in amino acids (lowers the nitrate concentration in the plant, raises the protein concentration).<br>Mo is also of importance in N fixation<br>Mo is a polyvalent ion that can switch valency ($2^+$ to $6^+$). Just as Fe is the element involved in photosynthesis.<br>Mo is a catalyst for various enzymes, and is inter alia also necessary for the formation of the hormone ABA |
| Sulphur (S) | S is the least known major element and is important in the young plant stage<br>It is a component of proteins (disulphide bridges bind amino acids together) and is thus very important for protein synthesis<br>In S deficiency the starch concentration is raised because the carbohydrate metabolism is slowed down (less breakdown of starch reserve) |
| Zinc (Zn) | Zn is necessary for the formation of the growth hormone IAA, indoleacetic acid, that is responsible for the stretching of the side- and middle veins of leaves<br>Zn activates some intermediary enzymes in protein synthesis (peptidase, proteinase, = breakdown of proteins) |
| Copper (Cu) | Cu is thanks to its polyvalency (just as Fe, Mn and Mo) important for reactions in electron transport as in photosynthesis.<br>Cu is necessary for lignification of plant parts (wood formation) and thereby improves the strength of plants<br>Cu also functions as intermediary in hormone maintenance (auxin formation) and thereby stimulates germination and growth.<br>Further, Cu is of importance in the synthesis of vitamins, and as intermediary in carbohydrate- and N metabolism |
| Sodium (Na) | Na is of importance in tissues with a special photosynthesis system (C4, CAM) |
| Chloride (Cl) | Cl is of importance in osmoregulation and in the maintenance of cell electrical neutrality in the plant<br>Cl also plays a part in photosynthesis, in particular in the oxygen production reaction<br>Cl is also a component of specific hormones |

| ELEMENT | DEFICIENCY | | SURPLUS | |
|---|---|---|---|---|
| | SYMPTOMS | RISK ENVIRONMENT | SYMPTOMS | RISK ENVIRONMENT |
| Nitrogen (N) | • light green colour old leaf; later whole plant<br>• much root growth | • winter: little fertilization mixing of organic matter in the soil | • dark leaf<br>• less rooting<br>• excessive plant growth | • too intense N fertilization |
| Phosphorus (P) | • less rooting<br>• red colour in old leaf (sometimes blue-green) | • high pH, excessive liming<br>• after cold or drought<br>• beginning of cultivation: greatest necessity | • dwarf growth (short stem, small leaf (=Zn deficiency) | • Uncommon, only in soil cultivation |
| Potassium (K) | • yellowing of old leaf edge<br>• incomplete / slow flowering | • winter: little fertilization<br>• high N, Ca, Mg-fertilization<br>• end of cultivation: greatest necessity | • yellowing of old leaf (Mg deficiency)<br>• yellowing of young leaf (Ca deficiency)<br>• fewer leaves | • excessive K fertilization |
| Calcium (Ca) | • leaf edge necro-sis to yellowing of young leaves (beginning at tip)<br>• transparency in leaf<br>• die-back at growth points | • dark, low humidity weather<br>• much K, NH4 | • yellowing of young leaf (Fe deficiency) | • p H too high |
| Iron (Fe) | • yellowing of young leaf between veins (over whole leaf) | • high pH<br>• much Ca, Cu, Mn, Zn<br>• wet cold soil | • red leaf edges and veins | • excessive foliar Fe fertilization |
| Manganese (Mn) | • yellowing of old leaves between veins (locally in leaf)<br>• less root growth | • high pH<br>• much Ca, K<br>• wet cold soil | • purple-brown spots in old leaf (later in leaf edges)<br>• later yellowing of young leaf (Fe deficiency)<br>• bushy growth | • very low pH |

| ELEMENT | DEFICIENCY | | SURPLUS | |
|---|---|---|---|---|
| | SYMPTOMS | RISK ENVIRONMENT | SYMPTOMS | RISK ENVIRONMENT |
| Boron (B) | • non-developing growth point<br>• malformed leaves beginning at base in young leaf | • high pH<br>• high Ca values<br>• boron free cultivation | • leaf tip necrosis in old leaf (leaf edge necrosis) | • low Ph, little Ca<br>• bad irrigation water / fertilizers |
| Molybdenum (Mo) | • light green colour-ation of young / old leaf =N deficiency<br>• long small leaves, rank form<br>• inhibited rooting | • low pH = the acid sickness | | • does not occur |
| Sulphur (S) | • complete yellowing of young leaf (veins more transparent than leaf pulp | • only in soil culture | • dark colour<br>• less root growth causes marked pH decline dwarf size growth; | • bad fertilizers or irrigation water |
| Copper (Cu) | • rigid growth yel-lowing to dark blue-green colour & curling of young leaf<br>• die-off of buds<br>• meristem necrosis<br>• bushy growth | • high p H<br>• too much Ca | • reduced root growth<br>• yellowing of young leaf (Fe deficiency) | • low pH |
| Sodium (Na) | | | • growth inhibition | • bad fertilizers or irrigation water |
| Chlorine (Cl) | | | • rooting inhibition<br>• leaf edge necrosis in old leaf<br>• dark colour | • bad fertilizers or irrigation water |

| APPEARANCE | LOCATION | pH POTTING | SOIL CAUSE | COMMENT |
|---|---|---|---|---|
| Leaf edges Leaf tips | young leaf | low pH | -Ca(+K+Mg) -Zn | low pH = little Ca, mostly in dark periods leaf edge necrosis + yellowing |
| | old leaf | low pH | +B | necrosis of the lower leaves proceeding upward |
| | | low + high pH | -K | chlorosis of the leaf edge |
| Leaf bleaching (yellowing or light green | young leaf | low pH | (-Mg) | (yellowing from underneath leaf edge between veins |
| | | | -Ca(+K+Mg) | transparency: light patches in leaves |
| | | high pH | Fe (+Ca) (+Mn+Zn+Cu) | yellowing over whole leaf (between veins) |
| | | | -S | complete yellowing of leaf + veins (similar to N deficiency |
| | middle young leaf | low pH | -Mg(+K) | yellowing from underneath the leaf edge (between veins) |
| | old leaf | low pH | (-Mg) | yellowing from underneath the leaf edge (between veins) |
| | | high pH | -Mn(+Ca) (+Mn+K+Fe) | localised yellowing (between veins) |
| | | low + high pH | -N | light green leaf colour, extensive root system |
| | young and old leaf | low pH | -Mo | light green leaf colour, poor roots |
| | | low + high pH | (-N) | (light green leaf colour, extensive root system) |
| Other colorations | old leaf | low pH | +Mn (-Ca) | Purple-brown patches |
| | | high pH | -P (+Ca) | red colouration (sometimes blue-green) old leaf, less rooting immediately after cold period |
| | young and old leaves | low pH | -S | dark coloured leaf, fewer roots, growth inhibition |
| | | low + high pH | +N | dark coloured leaf, fewer roots, growth inhibition, weak luxuriant growth |

| APPEARANCE | LOCATION | pH POTTING | SOIL CAUSE | COMMENT |
|---|---|---|---|---|
| Other effects | growth point | low p H | -Ca (+K +Mg) | die-off of growth point |
| | | high pH | -B (+Ca)<br>- Cu (+Ca) | die-off of growth point<br>meristem necrosis |
| | young leaf | high pH | - B (+Ca) | leaf malformation, starts from the base |
| | young + old leaves | low p H | - Mo (+$NO^3$) | small irregular leaves |
| | whole plant | low p H | + Mn (-Ca)<br>+ Cu (-Ca) | bushy growth<br>dwarf growth |
| | | high pH | - Cu (+Ca) | bushy growth, premature spiking |
| | | low + high pH | - Zn, +P | dwarf growth |
| | flowering | high pH | - P (+Ca)<br>- Cu (+Ca) | irregular flowering<br>bud die-off |
| | | low+ high pH | - K (+N) | incomplete delayed flowering |

TABLE OF CHEMICAL ELEMENTS REFERRED TO IN THIS ARTICLE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| B | Boron | P | Phosphorus | Mo | Molybdenum | Fe | Iron |
| K | Potassium | Ca | Calcium | Si | Silicon | Na | Sodium |
| O | Oxygen | Mn | Manganese | Cu | Copper | H | Hydrogen |
| C | Carbon | S | Sulphur | N | Nitrogen | Ni | Nickel |
| Mg | Magnesium | Cl | Chlorine | Zn | Zinc | | |

# The role of light (or radiation) on the growing of plants

**Dénis van Rensburg**

*Professor van Rensburg has a doctorate in Chemistry and retired as the Rector of Pretoria Technikon*

Green plants possess the amazing ability to manufacture their own food through the process of photosynthesis. It is this basic process upon which the entire world of living creatures depends for its own food, either directly by eating plants, or indirectly, by feeding on other organisms that have fed on green plants. The process of photosynthesis, or the manufacture of food using the energy of sunlight, is often expressed by this simple chemical equation:

PHOTOSYNTHESIS

Sunlight + $CO_2 + H_2O$ + Chlorophyll ⇄ $C_6H_{12}O_6 + O_2$ (Glucose) + (Oxygen)

RESPIRATION

Green plants have the unique ability to utilize the gaseous carbon dioxide ($CO_2$) of the atmosphere, plus water ($H_2O$), in the presence of an energy source (sunlight) and chlorophyll (in the leaves of plants) to produce glucose ($C_6H_{12}O_6$), a kind of sugar that is a basic food for the plant and give off oxygen ($O_2$) into the atmosphere as a by-product.

The important fact is that plants do not eat; we cannot 'feed' them. They manufacture their own food, beginning with the glucose produced during photosynthesis.

The mineral salts in fertilizers (or the naturally occurring mineral salts in the environment) are needed to complete the manufacture of food, to fabricate plant parts and to perform metabolic processes. A critical distinction between food and mineral nutrients, required by both plants and animals, is that food provides organisms with energy, minerals do not.

Carbon dioxide and water are the two major nutrients of plants and for plants to 'eat' or absorb these nutrients, sunlight (or the energy that is contained in sunlight) is absolutely necessary. But sunlight contains many different wavelengths or packets of energy. Just like a radio or TV set that only 'works' when it is tuned to a certain wavelength (or energy packet), so do plants only react to certain wavelengths and use that specific energy to manufacture food through photosynthesis. All the other light wavelengths are totally useless to the plant and may even be harmful. In Figure 1 all the wavelengths to be found in sunlight are shown. This wavelength range is commonly referred to as the 'electromagnetic spectrum'. From this figure it can be seen that the sunlight that reaches our plants or shade houses, apart from ordinary 'visible' light also contains X-rays, microwaves, radio waves, etc.

Because oxygen is produced when plants photosynthesize it is fairly easy to determine which wavelengths present in light are indeed preferred by the plant. All you need to do is to expose a plant to each different wavelength and measure the oxygen

produced. If no oxygen is produced, that specific wavelength has no effect on the chemistry of the plant. Figure 2 shows such an oxygen versus wavelength graph for the 'visible' light region.

Photosynthesis seems to be very high in the 'blue' and 'red' wavelength ranges and much less effective in the 'green' region and absent in all the other wavelength regions.

This effect of light on photosynthesis or plant growth could have been deduced from the green colour of the leaves. The colour of an object arises when the object reflects those wavelengths present in visible light that it does not want or cannot use. If we pass light from the visible part of the electromagnetic spectrum through a prism we can 'see' all the coloured components of so called 'white light'. The red component has slightly less energy than the green, while the blue and violet components have the highest energy (lowest wavelengths) in 'white' light. (See figure 3.) Hence an object such as an apple will appear to our eyes as yellow because it absorbs all the other colours and only reflects the light it does not want – the yellow (see figure 4). An object appears red to our eyes because it absorbs or 'likes' all the other colours of the spectrum but 'hates' red and hence reflects it. A white object reflects all the colours and hence appears white, while a black object appears black because it absorbs all the colours. Hence, strictly speaking, black is not a colour! (See figure 5.) By the same argument green plants hate green light, therefore they reflect the green light and appear green to the human eye.

This brings an interesting aspect to the fore when it comes to the choice of shade cloth for your plants – green would not be the ideal choice but rather blue or red, when we consider the information in the 'production of oxygen' curve (see figure 2).

Owing to the fact that the energy of radiation is inversely proportional to wavelength, UV- light will have more energy than white or visible light and causes much more damage to plastics, human skin and other substances. There is also more energy in 'blue' than 'red' light and 'blue' light or shade cloth should in theory produce a little more heating in plants in the shade house than similar red shade cloth. Infrared light has low energy but the energy is sufficient to cause heating if absorbed. Owing to their water content most plants are effective reflectors of infrared and are not greatly heated by it. Where shade cloth with a low percentage shade is used the colour of the cloth is not very important because more than adequate white light will reach the plants for photosynthesis – with a high percentage shade cloth the colour of the shade cloth does come into play.

Klein, Edsall and Gentile (1965) published an interesting paper on the effects of near UV and green light on plant growth. The conclusions reached are that the near UV and green wavelengths may suppress the growth of plants which otherwise receive adequate levels of those wavelengths necessary for photosynthesis and normal development. Conversely the selective removal of near UV and green wavelengths from white light gave enhanced growth. From these scientific experiments it is evident that green shade cloth should as a matter of routine should not be used as a covering in shade houses. Owing to the total reflectance of white shade cloth varieties a higher than normal shade percentage should be used when using the white shade cloth.

The amount of pure sunlight needed by plants to manufacture their food has always been an unknown factor usually obtained by trial and error. What we usually observe when a plant is receiving too little light is that it may compensate by producing more light absorbing pigment - hence the leaves go darker green. It may also grow thin and leggy, trying to find light. It will probably not produce flowers or the flowers may be of poor quality. Conversely, if a plant is receiving too much light, it may try to adapt by reducing the amount of pigment - the leaves grow paler. If the amount of light is excessive, the leaf-tissue will be destroyed and leaves are scorched, especially in those areas where the leaf surface is at right angles to the incident light.

## THE EFFECT OF TEMPERATURE ON PHOTOSYNTHESIS

The effect of temperature on photosynthesis is a very important consideration. Though the photochemical reaction is not dependent on temperature the rate of photosynthesis does increase with increasing temperature. Figure 6 shows this effect.

While gross photosynthesis rises with temperature so does respiration and whereas the photosynthetic rate tends to flatten at about 25°C respiration continues to rise rapidly above this temperature. Consequently, the net photosynthesis (the production of energy compounds minus their use by respiration including photo respiration) must be considered continuously. It can be even better understood if we add a curve depicting respiration rate against temperature to the one shown in figure 6. (see figure 7.) Respiration increases strongly with temperature (same as with us humans) and at temperatures above about 35°C all the food manufactured is used to support respiration. At temperatures higher than 35°C plants therefore use more food than they produce to respire, which leads to deterioration and ultimate death (if the condition is allowed to continue for too long).

In their natural habitats plants are subjected to a day and night temperature differential, and it is important to imitate this as far as possible. Photosynthesis is affected by temperature as well as light intensity. As long as it does not become too hot, the rate of photosynthesis, and hence growth, increases with rising temperature, but only as long as there is sufficient light (and carbon dioxide). Not only is there no point in increasing the temperature of the greenhouse beyond 25°C if there is not sufficient light it is positively harmful as the rate of photosynthesis will, even at 25°C, fall below the rate of transpiration.

Technically speaking, when gains due to photosynthesis match losses due to respiration, this is termed the 'compensation point'. The practical value of appreciating this is that if night-time temperatures are too high, plants will gradually become depleted of their glucose and starch reserves, as losses due to respiration regularly exceed gains due to photosynthesis during the day.

## DIFFUSE RADIATION AND ALBEDO VALUES

Diffuse or sky radiation is that radiation which reaches the earth's surface after being scattered from the direct beam by molecules in the atmosphere or reflected from clouds or other objects. On clear days it increases with solar elevation up to 30°C but after this it remains constant. It is diffuse radiation which gives the light in shaded areas and this is the main source of light for *Clivia*.

Diffuse radiation is very important for places of high latitude where low solar elevations reduce the direct solar energy due to thicker atmosphere passage, hence more absorption. For example, in England diffuse radiation may contribute from 50 to 100% of the total radiation used by plants. Hence the typical English glasshouse has the maximum amount of glass in walls and roof to catch this omni-directional radiation.

In South Africa our proportion of diffuse radiation is much lower but we still build English-European style glasshouses, then promptly cover them with shade cloth to reduce the intense direct radiation on to the glass. What makes it even worse is that we use green shade cloth!

Figure 8 shows the various light inputs to a typical horizontal leaf. These are

- Direct radiation from the sun (SA)
- Diffuse radiation from the sky (SD) - on overcast days this may be the main source of light
- Both direct and diffuse light reflected from the ground: R (SA + SD), where R is the reflectance from the ground, or the albedo value. These albedo values can be of great help when we have a problem with too much or too little light.

In the case of *Clivia* we usually never have direct radiation falling on our plants, hence the light used by *Clivia* to photosynthesize mostly comes from diffuse radiation and reflected radiation (albedo) only.

| LIGHT REFLECTANCE (ALBEDOS) OF CERTAIN SURFACES | |
|---|---|
| Surface | Reflectance |
| Dry soil: light colour | 0,3 |
| dark colour | 0,15 |
| Asphalt | 0,05 to 0,2 |
| Concrete | 0,1 to 0,3 |
| Brick | 0,2 to 0,4 |
| Class - sun angle 60° + | 0,8 |
| - sun angle 10° - 60° | 0,09 to 0,56 |
| Whitewash | 0,5 to 0,9 |

Table 1 indicates the albedos of certain common surfaces.

The higher the albedo value the better the reflectance of the surface.

Remember that the radiation energy (or light) we measure at our *Clivia* will be the 'combined effort' or sum total of all the diffuse and reflected radiation reaching the plants.

The correct unit to measure radiation energy is in watts per square meter (Wm-2). Because foot candles make more sense to me and because my light meter is calibrated in foot candles, I will use this non-Si unit. Just to give some idea of the values involved on a clear day without too much smog, with a high sun angle (warm temperature or tropical) and little cloud we could have

SA = 10,000 foot candles; SD = 1,370 foot candles and albedo contribution = 1,580 foot candles.

The rate of photosynthesis is proportional to the light intensity received by a plant up to a maximum of about 5000 foot candles. At 5000 foot candles most plants are at 100% photosynthetic efficiency and light intensity levels above this value are of little or no benefit and can only cause heat exhaustion and undue drying of the plant. The light intensity of a full sun on a clear day is approximately 10000 foot candles – where a foot candle is the amount of light cast by one candle at a distance of one foot. At 5000 foot candles most common outdoor plants are at 100% efficiency and light levels above that can only lead to heat increase, plant exhaustion and undue drying of the plant. This value will be considerably lower for shade growing plants.

As a general rule *Clivia* can grow happily in a light intensity as low as 650 foot candles of quality light! An error I frequently make when measuring the light intensity near my plants is to assume that the reading represents that of quality useable light. If there are many trees nearby or green shade cloth is used, a fair percentage of the light reading will be due to 'green' or useless radiation, giving one a false sense of confidence about the intensity quality of the light.

**PHOTOPERIODISM**

Plants of our temperate zone can be categorized into short-day neutral and long-day plants. The dividing line between day lengths favorable to vegetative growth and those to cause seed and flower formation is called the critical light period. For most species the critical light period is between 11 and 16 hours per day.

The intensity of the light and the duration of exposure combine to let us know the quantity of light received by the plant. As a general rule the intensity of 1000 foot candles is the minimum light intensity for ordinary plants and the minimum quantity of light is 15000 foot candle hours (light intensity multiplied by the duration of exposure in hours).

The relative length of the daily light and dark periods controls flowering of many kinds of plants. This phenomenon is called photoperiodism. Hence photo-periodism is the length of time a plant is exposed to light. Some plants, such as certain varieties of Chrysanthemum, Poinsettia, 'Morning Glory', are short-day plants and flower in nature only when the days are short and the nights are long. Certain varieties of spinach, beet, barley, and tuberous-rooted begonia are examples of long-day plants, which flower in nature only when the days are long and the nights are short. Flowering of many other kinds of plants is hastened but not absolutely controlled by the appropriate day length.

Bulb and tuber formation are also controlled by day length. Tuberous-rooted begonia, which is a long-day plant for flowering, produces tubers on short days but not on long days. Onions, on the other hand, produce bulbs on long days but not when the days are short.

Dormancy, and thereby the preparation of woody plants for the coming winter is another plant response regulated by photoperiod. Even in a warm hothouse many plants can be stopped from becoming dormant by using artificial light to keep the days long.

Responses of many plants are regulated not by the length of the light period but by the length of the dark period. Thus, a long-day plant is really a short-night plant, and a short-day plant is really a long-night plant. Therefore, when a long dark period is broken into two short

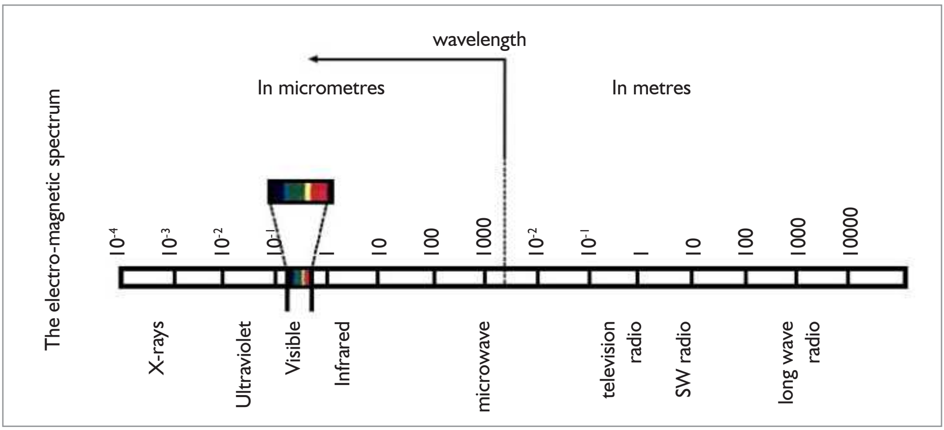



Figure 1: The electro-magnetic spectrum

periods by a relatively brief exposure to light near the middle of the period, long-day plants bloom, dormancy in woody plants is prevented and onions produce bulbs. Under the same conditions short day plants remain vegetative.

This poses an interesting question: Is it not possible that the *Clivia* is also susceptible to photoperiodism? *Clivia miniata* flower in spring but many produce 'surprise' flowers in autumn at times when the days (and nights) are almost as long as in spring!

Quite an interesting thought to leave you with, isn't it?

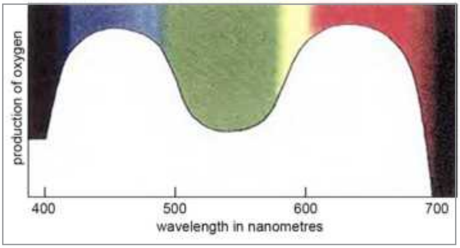



Figure 2: Photosynthesis vs colour (action spectrum of a typical leaf)

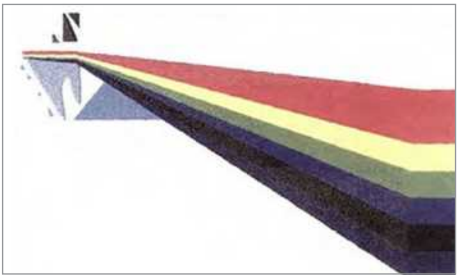


Figure 3: Reflection of 'white' light through a prism

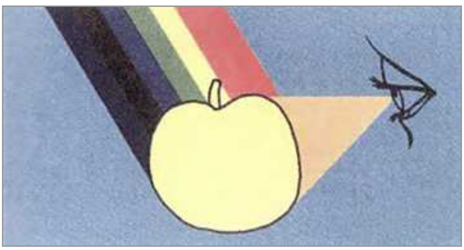


Figure 4: An apple appears yellow because it reflects the yellow wavelengths that it does not need for it's chemical reactions

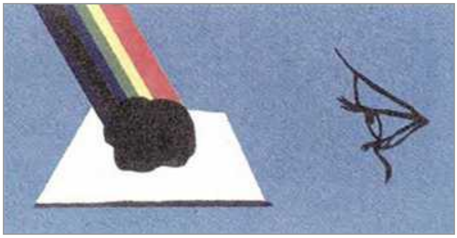


Figure 5: Black is not a colour but only an indication of the absence of colour

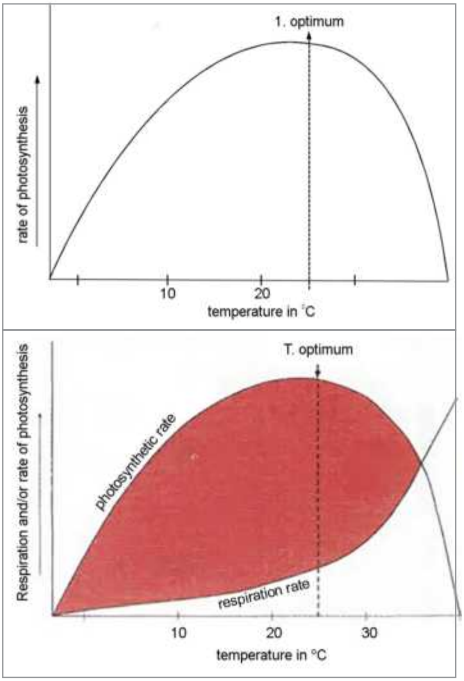



Figure 6 and 7: Effect of temperature on photosynthesis

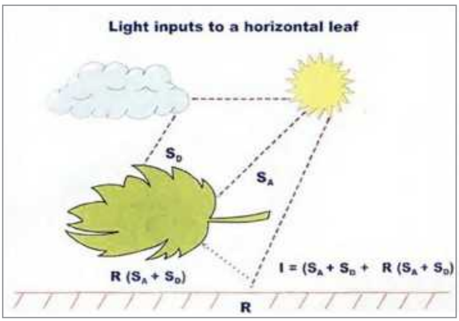



Figure 8

# Clivia Society 'Virtual' miniata show 2021

The winners of the various miniata classes have been published previoulsy. The first and second runners-up in the miniata Classes are presented below. See if you agree with the judges by looking through the second and third placed awards. This gallery is a collection of plants entered into the various 'Show' categories-not a photographic competition!

Clivia Society 'Virtual' miniata Show – Red Class – Second place – Andre du Toit

Left: Clivia Society 'Virtual' miniata Show – Red Class – Third Place – Stefan Ferreira

Left: Clivia Society 'Virtual' miniata Show – Orange Class – Second Place - Stefan Ferreira

Clivia Society 'Virtual' miniata Show – Yellow Class – Second Place Stefan Ferreira

Top: Clivia Society 'Virtual' miniata Show – Class Orange – Third Place – Stefan Ferreira

Clivia Society 'Virtual' miniata Show – Yellow Class – Third Place – Paul Kloeck

Clivia Society 'Virtual' miniata Show – Pink Class – Third Place – Jan Schmidt

Clivia Society 'Virtual' miniata Show – Pink Class – Second Place – Carrie Kruger

Clivia Society 'Virtual' miniata Show – Apricot/ Salmon Class – Third Place – Carrie Kruger

Clivia Society 'Virtual' miniata Show- Apricot/ Salmon Class – Second Place – Sue Kloeck

Clivia Society 'Virtual' miniata Show – Peach Class – Second Place – Carrie Kruger

Clivia Society 'Virtual' miniata Show – Green Class – Second Place – Carrie Kruger

Left: Clivia Society 'Virtual' miniata Show – Peach Class – Third Place – Andrew Kajewski

Clivia Society 'Virtual' miniata Show – Green Class – Third Place – Rex and Deidre Williams

Clivia Society 'Virtual' miniata Show -Orange with green throat Class – Second Place Andre du Toit

Top: Clivia Society 'Virtual' miniata Show – Orange with green throat Class – Third Place – Carrie Kruger

Clivia Society 'Virtual' miniata Show – Bronze/ Brick with green throat Class – Second Place – Rex and Deidre Williams

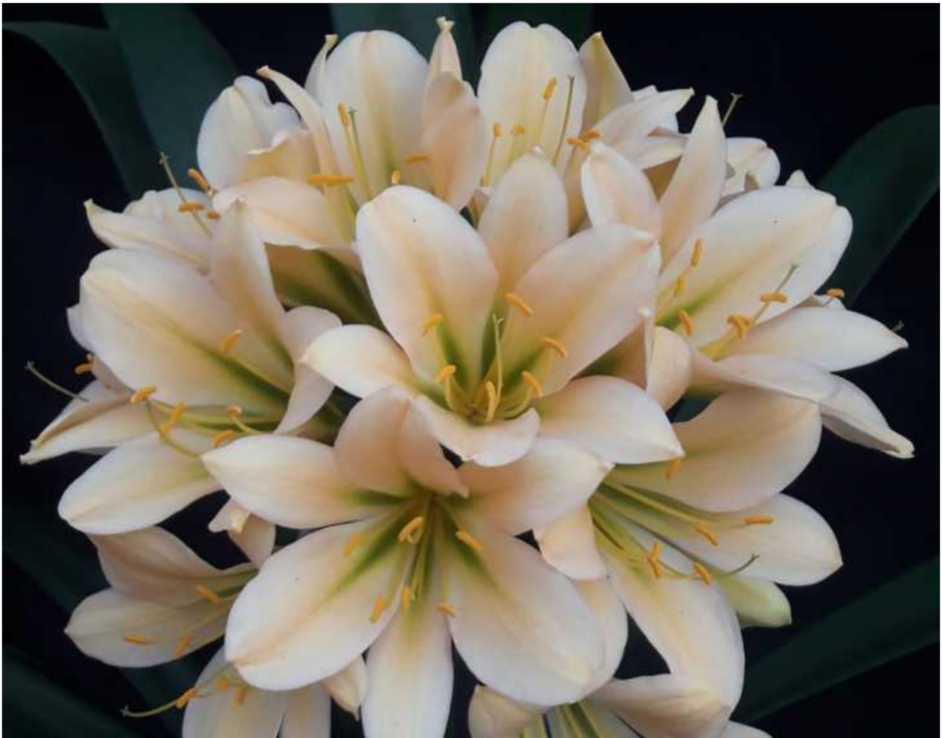
Below: Clivia Society 'Virtual' miniata Show – Bronze/Brick with a green throat Class – Third Place – Stefan Ferreira

Clivia Society 'Virtual' miniata Show – Yellow with green throat Class – Second Place – Carrie Kruger

Right: Clivia Society 'Virtual' miniata Show – Yellow with a green throat Class – Third Place – Lionel and Jeanne Martens

Clivia Society 'Virtual' miniata Show – Pink with a green throat Class – Second Place – Carrie Kruger

Clivia Society 'Virtual' miniata Show – Pink with a green throat Class – Third Place – Carrie Kruger



Clivia Society 'Virtual' miniata Show – Peach with a green throat Class – Second Place – Stefan Ferreira

Right: Clivia Society 'Virtual' miniata Show – Peach with a green throat Class – Third Place – Rex and Deidre Williams

Clivia Society 'Virtual' miniata Show – Appleblossom/Blush Class – Second Place – Carrie Kruger

Right: Clivia Society 'Virtual' miniata Show – Appleblossom/ Blush Class – Third Place – Carrie Kruger

Right: Clivia Society 'Virtual' miniata Show – Ghost/ Watercolour Class – Third Place Carrie Kruger

Clivia Society 'Virtual' miniata Show – Ghost/ Watercolour Class – Second Place – Carrie Kruger

Clivia Society 'Virtual' miniata Show – Bicolour Class – Third Place – Chris Smit

Left: Clivia Society 'Virtual' miniata Show – Bicolour Class – Second Place – Paul Kloeck

Clivia Society 'Virtual' miniata Show – Splash Class – Third Place – Andrew Kajewsky

Left: Clivia Society 'Virtual' miniata Show – Splash Class – Second Place – Jan Pohl

Clivia Society 'Virtual' miniata Show – Versicolour Class – Second Place – Rex and Deidre Williams

Clivia Society 'Virtual' miniata Show – Multitepal Class – Second Place – Chris Smit

Clivia Society 'Virtual' miniata Show – Versicolour Class – Third Place Rex and Deidre Williams

Clivia Society 'Virtual' miniata Show – Multitep al Class – Third Place – Chris Smit

# 'Super Stripes' a clivia flower of Pine Pienaar

**As told by Chris de Vry**

The spectacular combination of the red and white colouring of 'Florid White Lips' (FWL) has always appealed to Pine Pienaar. He imported several of the FWL plants some fifteen years ago and has used them in his breeding program. His aim is to produce large white flowers with splashes of red. He has used the FWL pollen on some of his special plants. Fortunately, Pine has a commercial nursery and is able to grow all his seedlings until they flower. From these resulting crosses, he then select those flowers that exhibit his ideal flower patterns.

One of these experimental crosses produced a plant that he called 'Stripes', with white stripes on a pink background. One of the seedlings from this plant subsequently crossed with the pollen of FWL, produced a plant that he call 'Super Stripes'. The umbel on this plant has most of the tepals displaying the striped pattern.

'Super Stripes' proved to be very popular with collectors and there is a great demand for a similar flowering plant. To increase the number of similar plants, tissue culture is not a suitable option, so he has to be patient and wait for the production of offsets or breed similar patterned tepals by line breeding or something similar. Fortunately, 'Super Stripes' has over time been a reliable producer of offsets. Shown below are images of a number of these offsets in flower. Not all the offsets produce these striped flowering patterns. Pine insists on waiting for an offset to flower and display the striped pattern, before selling the plant.

The variegation pattern of the offsets of 'Super Stripes' seems to depend on the position of the offset on the stem of the mother plant. Some of the offsets, typically less than a third, do not have the striped pattern on the flowers. See images below.

Reproduction through line breeding seems to be possibility as they do seem to be display maternal inheritance. Seed set when selfed is not great, but he has managed to produce one F1 plant with a similar striped pattern. Going forward he hopes to use this F1 crossed with pollen of his 'Super Stripes' and to self the F1 plant. As with all his crosses he has learnt to be patient and hopes to be rewarded with a similar flowering plant in future.

Below is an example of one of the offsets from the mother plant 'Super Stripes' that does not show the 'stripe' pattern.

Right: Original 'Super Stripes' image

Offsets from original mother plant

# Why do Clubs fail?

**G Middlewick**

The membership of the Clivia Society, both nationally and internationally, has shown a decrease over the past few years. Recently there is some evidence of clubs threatening to close.

Is there a simple explanation for the loss of membership numbers? In an article found in the RMS Bulletin we find some explanations for the fall in numbers.

1) Attrition. The hobby of ours does appeal to the older members. The reasons for ending membership are multiple and include, financial, smaller property sizes, lifestyle changes or frailty of persons. Some collectors drop out, often temporarily, others move to different areas.

An important cause, though not the main one is the personality clash of club members. This may lead to a lack of co-operation amongst members and a loss of interest in the club.

Unsurprisingly the commonest cause of a club failing is the lack of people willing to do the work! For the efficient running of a club, basic requirements need to be performed by members. These tasks include items such as organizing meetings, talks, shows, providing articles, membership renewal and recruitment of new members. When a club has a few vital members and these leave, there is a problem with the continuation of the club's existence. This is one of the main reasons why new officers are needed to ensure the smooth handover to a new generation of members. Some towns express a demand for the formation of a new club, but the members willing to initiate and maintain the club are not available.

Does it matter if clubs fail? Yes absolutely! In the long run, new potential collectors are lost to the hobby. The existing members will move to another club. The local potential informal collectors are the ones that are lost to the hobby. Club activities attract many potential collectors such as shows and displays. The impetus of the local club to welcome members and encourage them is important in attracting a larger membership. The closing of a club has

a ripple effect. No socializing, no exchange of knowledge or the provision of information.
Clubs are more concerned about membership recruitment, than finding officers to fill the essential positions of the clubs. New members are always welcome and potentially provide office bearers of the future. Some clubs are resorting to the use of non-collectors to administer their club affairs. Consolidating the positions on the committee is one solution, but this results in fewer people responsible for club affairs. The potential resignation of a few officers on the committees should not result in the closure of the clubs!

# The Clivia Society 'Virtual' Show 2022

This, our third 'Virtual' Show, runs from the 1st of February until the 14th of October 2022.

All members of the Clivia Society are welcome to enter images into the 'Society Virtual interspecific and miniata Shows'. Entries that have been submitted elsewhere are welcome to be entered into these shows, with the required symbol and class number.

** The symbol that must be included with each photograph is an '@' symbol - Not edited into the photograph afterwards!

** Entries should only be submitted to Karel from the 1st of July until the 14th of October 2022

** Entries should be submitted to Karel Stanz at 082-559-6672.
E-mail address is karel.stanz@up.ac.za

## 'VIRTUAL SHOW' – C. MINIATA CLASS LIST

| CLASS | CLASS DESCRIPTION |
|---|---|
| 1 | Red |
| 2 | Orange |
| 3 | Yellow |
| 4 | Pink |
| 5 | Apricot, Salmon |
| 6 | Peach |
| 7 | Green |
| 8 | Orange with Green Throat |
| 9 | Bronze/ Brick with Green Throat |
| 10 | Yellow with Green Throat |
| 11 | Pink with Green Throat |
| 12 | Salmon, Apricot with Green Throat |
| 13 | Peach with Green Throat |
| 14 | Appleblossom-like/ Blush |
| 15 | Ghost/ Water Colour |
| 16 | Bi-Colour and Picotee |
| 17 | Splash |
| 18 | Versi-colour |
| 19 | Multitepal 100 percent – With or Without Green Throat, 7 Tepals or more |

## PENDULOUS SPECIES - CLASSES FOR CLIVIA SOCIETY 'VIRTUAL SHOW'

In this group it is acceptable to have the tips of the flowers to be of a different colour from the main flower colour.

| | |
|---|---|
| 100 | Red |
| 101 | Orange |
| 102 | Yellow |
| 103 | Pink |
| 104 | Apricot/ Salmon |
| 105 | Peach |
| 106 | Green |
| 107 | Bronze |

## INTERSPECIFIC CLASSES FOR CLIVIA SOCIETY 'VIRTUAL SHOW'

There are two large groups in the interspecific flower class entries:

A) Non-recurved - an insignificant flare at the tip of the flower does not exclude a flower from this group.

B) Recurved – the flares at the tips of the flowers are obvious and significant.

## A) NON-RECURVED FLOWER ENTRY FOR THE INTERSPECIFIC CLASSES OF CLIVIA SOCIETY 'VIRTUAL SHOW'

| | |
|---|---|
| 120 | Red |
| 121 | Orange |
| 122 | Yellow |
| 123 | Pink |
| 124 | Apricot, Salmon |
| 125 | Peach |
| 126 | Green |
| 127 | Versicolour |
| 128 | Bronze |
| 129 | Multicolour |
| 130 | Multitepal – 100 percent multitepal |

## B) RECURVED FLOWER ENTRIES FOR THE INTERSPECIFIC CLASSES OF CLIVIA SOCIETY 'VIRTUAL SHOW'

***The umbel will be assessed by the judges. Umbels that look as though they are Miniata blooms will not be allowed to qualify in this section.

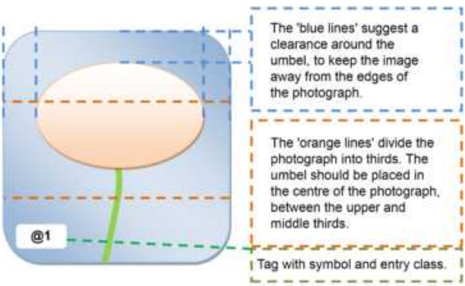
| | |
|---|---|
| 140 | Red |
| 141 | Orange |
| 142 | Yellow |
| 143 | Pink |
| 144 | Apricot/Salmon |
| 145 | Peach |
| 146 | Green |
| 147 | Versicolour |
| 148 | Bronze |
| 149 | Multicolour |
| 150 | Multitepal – 100 percent multitepal |

To ensure that the image is a photo taken within the required date line, a symbol will be required to be included with the class entry number on an identification tag in your photograph. The tag should be neat and small. The class and the symbol must be legible.

UMBEL PHOTO LAYOUT SUGGESTIONS

The 'Virtual Show' is a photographic show, entries are judged by the images submitted.

Present the best side of the umbel to the camera. Use good lighting conditions and a uniform background. The leaves are not assessed. The pot is not seen. Make the size of the photograph at least 450Kb. Maximum size is 2MB.




EXAMPLE OF A TAG


Dimensions 4 by 2 cms.
The Symbol and class must be included on the tag.

- One tag per photograph. The tag should be positioned at the bottom left-hand corner of the photo.
- No colour manipulation is allowed.
- You may crop your photograph.
- Ideally your picture should be taken in natural light away from direct sunlight – not under coloured shade net – such as green or blue.
- Please consider the background of the photo, make it uniform – give your umbel photograph the best chance to win!
- The absence of an identification class and the 'secret' symbol will disqualify your entry from the 'Virtual miniata and interspeicific Show'.

The number of entries per class is limited to two. NO CHARGES FOR ENTRIES.

This limitation of the number submitted, implies that before you submit your photos for a specific class, make sure that the best two images in a class are selected prior to submission. Early submission will still limit you to a total of two entries per class. No photo may be cancelled or withdrawn once it has been entered into the 'Virtual Show'.

SUBMIT

WhatsApp number is 082-559-6672 e-mail address is karel.stanz@up.ac.za

Add your name to the WhatsApp message, in the event that Karel does not have you registered on his telephone.

No entry number or code for participants is necessary and each entry will be allocated a random number which will grant anonymity for the entry.

On the 16th of October all the entered images will be submitted to various judges for a final decision. The interspecific show will be assessed first and then the miniata show. The allocation of judges for the various classes will be decided by the Judging Committee. Once the results are available, they will be circulated on Facebook and on the Clivia Society web page.

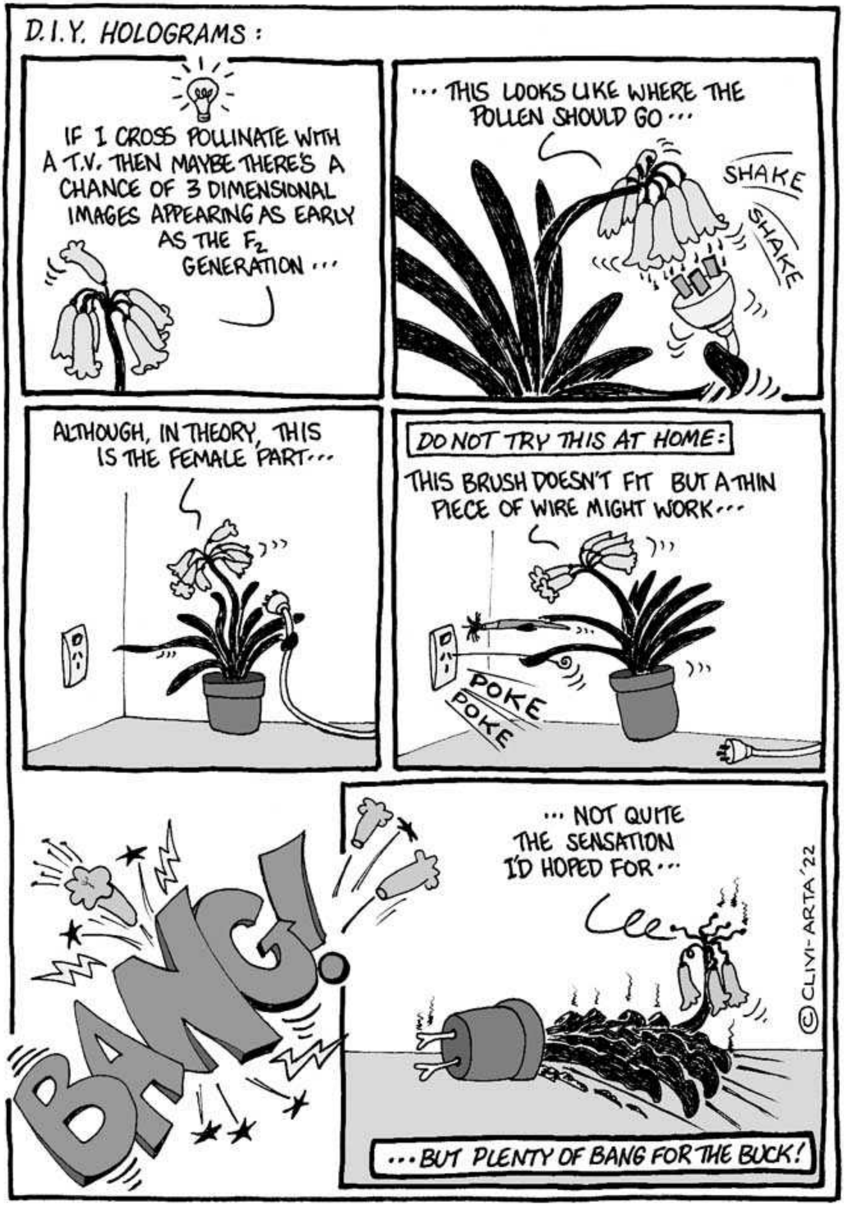
The time taken for the completion of the judging by the judges will depend on the number of entries and the physical limitations. Please be patient for the results.

Once the photographic images have been submitted, the images will be loaded on to the Gallery of the Society website page. (www.cliviasociety.com)

To ensure a successful 'Virtual Show', the more participants that submit entries, the better the show!

# Clivi-Arta

**Helen Sanders**



Best on Show – Garden Route Clivia Club 'Virtual' Interspecific Show – Carrie Kruger

Garden Route 'Virtual' Interspecific show- Runner-up – Nico Cloete

Left: Garden Route Clivia Club – Virtual Interspecific Show – Third Best on Show – Carrie Kruger

Garden Route Clivia Club – 'Virtual' miniata Show – Best on Show – Carrie Kruger

Garden Route 'Virtual' miniata Show – Runner-up to Best on Show – Carrie Kruger

Garden Route 'Virtual' miniata Show – Third Best on Show – Gerhard Faber

# 2022 Membership Fees of the Clivia Society

**Subscriptions are for a single calendar year – January to December.**
**The fees below include postage except where mentioned.**

| | | |
|---|---|---|
| Australia | Pay to Lisa Fox: lisa.fox@gmail.com | $ USA 30.00 |
| USA | Pay to North American Clivia Society www.northamericancliviasociety.org | $ USA 35.00 |
| New Zealand | Alick McLeman: clivia@xtra.co.nz> | $ USA 30.00 |
| United Kingdom | Steve Hickman: hickman.sss@btconnect.com | £ 25.00 |

**International – other than the above countries:**

Pay Clivia Society – Paypal gcmidd@mweb.co.za $ USA 30.00

**South African Members:**

Pay local club membership fee to the treasurer (Varies)

China: Only digital copies $10 US

**The club membership, includes a R250.00 affiliation fee to be paid to the Society by the club. The postage cost of publications sent to the clubs by the Society is an extra fee, to be paid by the clubs.**

# Advertisement Costs in Clivia News – 2022

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