



## PRESIDENT'S MESSAGE

Dear Members. As I write this message today in mid-May, the season has gone from the beauty of early autumn to a very wintry feel. To offset this gloomy sky I am enjoying seeing some *C. gardenii* in flower. Hopefully I now have some mid-season interspecifics to enjoy in flower before the main *C. miniata* season in spring. While on a day like today, thoughts of spring seem far off, the committee and the newly appointed sub-committee are focused on planning a successful day. MCG Vice President Peter Haeusler is chair of the sub-committee. Peter has previous experience as Expo Convenor and is joined by Brenda Girdlestone, Erika van der Spuy, Haydn Lomas, Mal Foster, Yvonne Hargreaves and Andrea Whitty. We are lucky to have a team with a wealth of experience from various fields to plan our big event. I'm trying to observe new places that are happy to display flyers, so please keep a note of where you can help promote CLIVIA EXPO 2015.

The April meeting was well attended. I am glad to say that the new audiovisual purchase of a data projector was easy to use, and was such a benefit to illustrate the lives of Sir Thouron and Sir Smithers. I hope those unable to attend the meeting will enjoy the article included in this volume. I was enlightened by the presentation and group discussion led by Rae Begg and Peter Haeusler. I have a much clearer idea of the properties of potting medium, particularly water holding and air capacity of the mix, and in addition the importance of this mix not decomposing too quickly. A lively discussion followed with a variety of experiences shared, including the successful use of animal manure as a "jiffy pot" of sort for seeds that are left to their own devices under trees in South Africa. It seems that there is a range of what works for some and not others. Partly this is because

everyone has a number of micro climates, controlled versus natural watering, light, and air movement being key aspects. I am going to do an audit on my collection and will likely replace the medium I have used in the past with a better mix, hopefully this will help eliminate root rot.

I am pleased to report that the raffle prize donated by Mark Cant of an offset of Bill Morris' "Best Kept Secret" was a huge success financially, and I jumped out of my chair when I won the prize. I felt somehow blessed and did not miss the coincidence that I was presenting a talk on two famous yellow *Clivia*. Thanks to John Trotter for donation a wonderful *C. nobilis* and Yvonne for the donating the fertilisers. The Trading Table had some great offerings, and a number of members found something special to add to their collections. Please bring plants to sell at meetings, however in addition to a clearly completed trading table form with details of what is offered, be reminded that you are required to assist on the Trading Table, no one can better answer questions about what is offered than yourself, and this helps sell the plant as well. The June meeting holds promise of being a 'peach of a night for raffle ticket buyers'. Raffle tickets are now 2 for \$5 - a good incentive to purchase more tickets and be in the running for multiple wins.

I hope all members in Melbourne will be able to attend our next meeting on 19<sup>th</sup> June when Greg Anderson will be our interstate guest speaker. Greg will be discussing "Breeding with Anderson's Peach". I have read a little of the Anderson's pollination techniques and lengths they go towards ensuring crosses are kept isolated. I look forward to hearing more about this and the observations Greg is making as seedlings grow to flower. This is sure to be a great night.

On 17<sup>th</sup> July Helen Marriott will present a pictorial account of the 2014 KZN Clivia show and associated events. This meeting will also be a real treat for members to be entertained and informed as to the wonderful new plants being presented in South Africa. If you have a friend that simply enjoys beautiful plants, this would be an ideal event to invite them to attend.

I wish to welcome here new members, Jules Hogan and Ken Smith. Many of you will know Jules already, as he is Di Mathews' husband. Jules was a fantastic help with set up, pack up and catering at CLIVIA EXPO 2014. The name Ken Smith and *Clivia* go hand in hand, with Ken being the Australian representative to the international Clivia Society, so it is a pleasure that Ken is a member of our group. I look forward to contributions both with bring to the group.

Lastly my sincere thanks goes to our newsletter and website editor Lisa Fox on the great job she does in making our publications look so professional, it is greatly appreciated by us all, thanks Lisa.

Michael Barrett

## CLIVIA MARKET

**Plants, seedlings,  
offsets & seed  
FOR SALE**

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LILYDALE 3140



## GENERAL MEETING

Friday 19 Jun 7.30pm

Uniting Church

Cnr Blackburn Rd &  
Burwood Hwy, Burwood

Breeding with 'Anderson Peach' -  
Greg Anderson

## COMMITTEE

Michael Barrett - President

Peter Haeusler - Vice President

Roger Clarke - Secretary

Rae Begg - Treasurer

Mal Foster - Committee members

Steve Wright

Yvonne Hargreaves

Deadline for next issue -  
15 July, 2015

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<https://www.facebook.com/pages/Melbourne-Clivia-Group-Inc/130556943692834>

## CULTIVATION NOTES

### Peter Haeusler

OK, so it's getting cold. Toughen up, put on an extra jumper and get out there among your *Clivia* as there is lots to attend to during winter. Here are a few suggestions:

- Clean fallen leaves (from deciduous trees and shrubs) out of the centre of your *Clivia* as litter can harbour snails and other bugs. Excessive litter may also impede the emergence of healthy flower spikes. BUT, remember that these leaves make great compost so leave them on the ground around those *Clivia* you have growing in the garden.
- Remove old, yellowing *Clivia* leaves as these harbour mealybugs and other pests.
- Start your attack on snails ... i.e. don't wait until the flowers are being eaten! Get the snail bait around, and repeat at intervals over the next couple of months.
- Be careful that plants aren't getting too wet (e.g. if they have ended up under a particular drip line or the pot is sitting in a depression) as this can mean that rot soon sets in.
- You can keep repotting *Clivia* in the colder months. However, as a rule I do not repot, or remove offsets, during the winter months as plants can sit and fail to generate root growth in the cold, with consequent fungal rot problems setting in. If, for some reason, I divide or repot a plant in winter, after the initial watering I take particular care to keep it relatively dry for a month or two.
- Check those plant labels. Yes it can be monotonous, but it is time well spent. Now and then I find that a dodgy 'permanent' marker means that descriptions on tags fade and one can get caught. I recently found details on a whole batch of plants I potted up a year ago had almost

totally disappeared and I detected this in the nick of time. Systematically looking at each plant in this way is also an opportunity to take stock of how plants are going more generally.

- You will also notice that your seed pods are ripening. I know that some people pick these while still green and then leave the spikes in a sugar solution for a short while before proceeding to remove pods and clean seeds. Frankly, I think nature is best equipped to ripen the pods properly (unless the stem has started to deteriorate sharply and you are at risk of losing the pods altogether). From my experience, seeds that are harvested while the pods are green can result in seedlings that lack the vigour of those raised from 'naturally ripened' pods.

## THE TWO SIRs

### Michael Barrett

The history of *Clivia* cultivation in Western horticulture is filled with many names and events. Publications by the Clivia Society provide accurate details of personalities of importance. Such resources can be referred to by newer enthusiasts, who share an interest in history. However, in the process of sharing information on the Internet, including the Clivia Forum, Yahoo groups and Facebook, some *Clivia* history is retold in a casual manner and, on occasions, inaccurately. Such is the case of Sir Peter Smithers and Sir John Thouron. These two gentlemen share many similarities; both men were of the same generation, with world events and shared passions shaping their lives. From time to time the two men are confused for each other, with mistakenly credit for an action mistakenly ascribed to the inappropriate person, or the two lives blended into a hybrid of achievements. Some psychology research (Fiske et al) suggests that



when people confuse or “misname” one person for another, it is because one shares the same relationship mode with the other who is misnamed. Here, it may be that both individuals of the same gender, generation and class and are similar in significance in the history of *Clivia miniata* cultivation. When a contributor is adding content to an Internet site, they may know well the two individuals concerned, but misname them, typing and thinking of the other, however newer enthusiasts may read this information as trusted and authoritative. Often with the chatty nature of posts and forums, errors are quickly corrected. It is in this context that I wished to present here a brief biography of the two gentlemen and their distinct roles and immense importance to the advancement of *Clivia*, particularly yellow/cream *miniata*.

It is important to put the rarity of yellow *Clivia miniata* into context. While we now enjoy relatively easy access to cream and yellow *Clivia*, it was a very different story 35 years ago yet alone before then. The earliest record of yellow *Clivia* is from 1888 when a plant was displayed in Europe. About the same time a plant was discovered in Eshowe, KwaZulu-Natal. It was formally described as *Clivia miniata* var. *citrina* in 1899. This plant, from this same area, was sent to Kew gardens around 1893 and is known as ‘Eshowe Yellow’ (Dixon, 2005).



John Thouron

Fig. 1 Sir John Thouron

John Rupert Hunt Thouron was born in 1907, Cookham, England to an American father, with Huguenot (French Protestants exiled in the 17<sup>th</sup> century) roots and a British mother. His father’s nationality would influence his later life and achievements. His father served and died in WWI. In 1930 John Thouron married Lorna Elliot and they had a son. John and Lorna divorced in 1939. In 1940, Mr. Thouron enlisted into the Gordon highlanders as a 2<sup>nd</sup> lieutenant and was commissioned to the Black Watch (Lewins, 2014). Later he was made a captain and served in the Special Operations Executive at Bletchley. His role was to assist with the establishment of resistance movements and sabotaging enemy communications. He also ran “House to House” fighting courses. Towards the end of the war, Thouron joined the Special Allied Air Reconnaissance Force and made many parachute jumps behind enemy lines to foil attempts to massacre prisoners of war (Lewins).

In 1953 John Thouron married Esther du Pont from the famous du Pont dynasty. The cooperation of the UK and USA forces in the Second World War had left an immense impression on Mr. Thouron. Together with his wife, in 1960 they established the Thouron Award to foster Anglo-American friendship through an academic exchange scholarship at the University of Pennsylvania. This award has assisted 1,000 students, two-third British, to study at the University of Pennsylvania or for US students to study abroad in their chosen field. Mr. Thouron was awarded a Companion of the British Empire in 1967 in recognition of his support and leadership of the Thouron Award program. In 1976, on the visit by HM Queen Elizabeth II to Philadelphia to mark the bi-centenary of American Independence, Sir John was made a Knight of the British Empire.

Sir John and Lady Thouron lived on a magnificent 220 acre estate called Doe Run. Located in the Brandywine Valley, this extensive garden and horse stud was internationally highly regarded. Sir John was assisted in presenting Doe Run by a Scottish head gardener, Jock Christie, a very modest and humble man and an excellent gardener. Jock worked at Doe Run in the mornings and in the afternoon would work next door at Runnymede that belonged to the Wister family. Jock’s son, John Christie, is presently in charge of the gardens at Doe Run. (L.T.Tran, personal communication, 2014). The gardens included alpine and herbaceous borders. Sir John also had a series of glasshouses that contained a wide variety of rare plants and an extensive orchid collection. In 1985, when Prince Charles and the Princess of Wales stayed at the British Ambassador’s residence, Sir John played an important role in providing unusual fresh flowers to fill the residence and he and Lady Thouron attended the Ambassador’s dinner held in the honour of the Wales (Blakely 2014).

Sir John would participate in the internationally famous Philadelphia Flower Show (PHS) held annually in early March. Regarded as the largest indoor flower show in the world, specimens would be judged in various categories. One plant that would cause great interest, and was awarded blue ribbons annually in its class, and on one occasion was overall Best Plant of Show was a cream *Clivia miniata* belonging to Sir John. When Jock Christie was interviewed for *The New York Times* in 1994 and said he had no idea where the plant originated, only knowing that it was at Doe Run before he arrived in 1963 (Raver, 1994). Sir John was a generous man, and first shared offsets of this special cream *Clivia* with special friends, including neighbors Pamela du Pont Copeland and Diana S Wister (Tran). Diana Wister, an heiress of the Campbell



## Melbourne Clivia Group Inc.

Soup fortune, is well known as a flower judge and for her success at the PHS in her own right. However two acts of generosity by Sir John allowed his special cream *Clivia* to become better known, and eventually accessible to people outside his circle of friends.



Fig. 2 'Sir John Thouron' owned by Mike Riska

The Delaware Center for Horticulture had held annual plant sales for a number of years before 1981, the year of their 25<sup>th</sup> anniversary. It was in that year that Sir John donated an offset of his famous yellow *Clivia*. The board of directors, delighted with this donation of such a precious gift, decided to organise their first rare plant auction. Details of that first auction will be recounted later in this text. The auction has been held annually since that year raising funds for urban agriculture, education and greening neglected inner city spaces. Access to this event is tiered, with the highest being 'Clivia level' guest at \$600 that includes a luncheon and exclusive preview of plants at Longwood Gardens. For a number of years the auction logo was a stylized yellow *Clivia*. (Fig. 3) The year 2015 marks the 35<sup>th</sup> Rare Plant Auction. The catalogue for this year's event pays tribute to the origins of its success as follows:



Fig. 3 A cut umbel of 'Sir John Thouron' - photo courtesy of L.T. Tran

### *Clivia miniata*

#### 'Sir John Thouron'

*Our 35<sup>th</sup> anniversary wouldn't be complete without the centerpiece that launched the Rare Plant Auction – the magnificent Clivia miniata 'Sir John Thouron'. Its elegant beauty has made it a bidding sensation throughout the years and we are pleased to offer our signature plant for this special occasion. Originally brought from Britain to Philadelphia in the 1950's by the late Sir John Thouron, a legendary local plantsman, this Clivia was notable for its formal, upright habit and unusual flower color. The funnel-shaped flowers are a clear, soft primrose yellow that deepens slightly at the throat. Fruits ripen to yellow for a second display against the strong, strappy foliage. (2015 catalogue page 47)*



Fig. 4 Delaware Center for Horticulture logo - <http://www.thedch.org/activities-events/rare-plant-auction/history-rare-plant-auction>

Annie Raven (1994) recounts the events of the first Rare Plant Auction and White Flower Farm's sale of the yellow *Clivia* in an article in *The New York Times*. The first yellow *Clivia* donated by Sir John was the prize lot of the evening and sold for \$1700 to a New York real estate executive, MacRae Parker Jr. (Raven). When interviewed, Parker said he had been growing orange *Clivia* for 50 years. When news came that a famed yellow *Clivia* was to be auctioned he begged, almost daily, to attend the event, which was a sit down dinner for members of the Natural History Museum. When a cancellation allowed him to attend he was delighted. The auction was intense, and he lowered his hand in near defeat until a woman lent over to him and said, "I thought you came to buy that plant". He continued to bid and finally won the auction. In subsequent years that plant produced many offsets and Mac Rea Parker Jr. has donated offsets to other auctions. Raven, in the same article, also describes the events that brought that special yellow *Clivia* to wider availability. Mr. Frowine from White Flower Farm nursery in Connecticut approached Sir John on two occasions. He proposed to Sir John to donate his highly desirable yellow *Clivia* to Longwood Gardens and White Flower Farm, with a percentage of proceeds from the sale of plants to go to the Thouron Award. Longwood received 90



plants to grow on to flowering size. Half of these were presented for sale in 1994, at \$950 each, with a limit of one per customer. It was Longwood garden that named the plant 'Sir John Thouron' in recognition of his generosity (Raven).



Fig. 5 'Sir John Thouron' owned by Rob Oliver

Ester du Pont died at their winter home in Florida in 1984. Sir John lived another 23 years to reach 99 years of age and also died in Florida in 2007. The generosity of Sir John made this special yellow *Clivia* within reach of enthusiasts over a period of time. This plant is held in various collections around the world, often a part of a *Clivia* narrative, holding special significance and sentimental value in addition to its beauty and value in hybridising programs.

In contrast to the private life of Sir John Thouron, the life and achievements of Sir Peter Smithers are well documented and accessible via a number of pathways. He does receive mention in the famous Who's Who, Sir Peter also provides an autobiography of his life in his book *Adventures of a Gardener* (1995). Sir Peter furthermore supplied a personal history of his life with plants when he was awarded the Herbert Medal from the International Bulb Society in 1997. A number of obituaries appeared in various UK papers, contextualising and detailing his political and horticultural contributions. His wide interest and contribution towards a number of plant varieties, such as tree peonies, *Nerine* (ex Rothschild's famous

Exbury strain), *Lilium* and *Clivia*, mean his name is part of the cultivation history for each plant genus. For the benefit of the reader, a very brief biography is provided here.

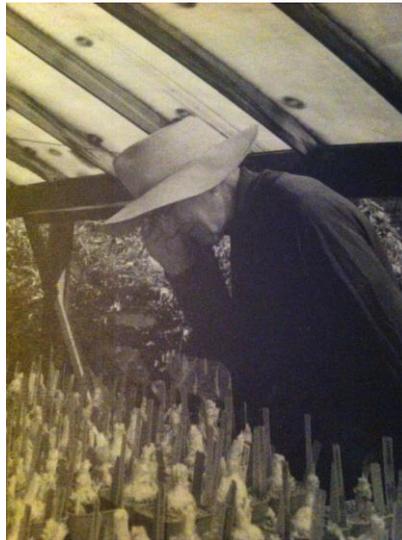


Fig. 6 Sir Peter inspecting the nerine bulbs' photo taken from *Adventures of a gardener*

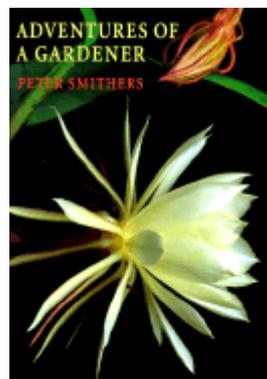


Fig. 7 *Adventures of a Gardener* - book cover

Peter Henry Berry Otway Smithers was born in 1913, son of Lt. Col and Mrs. H Otway Smithers in Yorkshire, England. Sir Peter Smithers describes his early years as follows. As a child his parents were away with war service, and young Peter was raised by a nanny who shared a love of gardening and nature. As he grew he would shadow gardeners on his parents' and his aunt's properties, and they taught him skills including

germinating seeds, growing and displaying potted plants. At 13 he was sent to Harrow for his education, and here fell in love with lilies in a big way. At this time he also persuaded the Royal Horticultural Society (RHS) to admit him to the Chelsea Flower Show, the first child to be given permission to attend. School was uninspiring until a new master sparked Peter's interest in history and politics. Young Peter started at school a plant index to record his plants, which continued until 1993 with 32147 entries, (by which stage, the man, Sir Peter, embraced computer technology to record his plants). After Harrow, young Mr. Smithers went to Oxford University to study history, and was awarded a doctorate with his study of 18<sup>th</sup> century essayist, Joseph Addison. He then went on to study law.

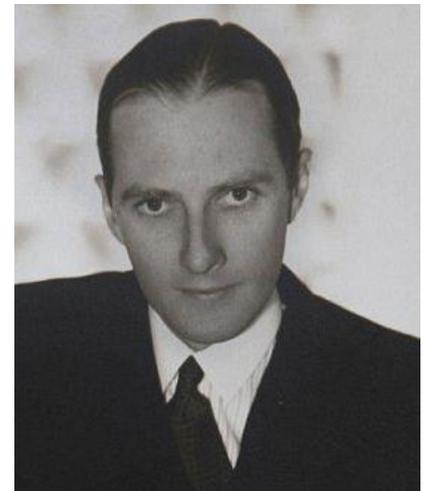


Fig. 8 Sir Peter Smithers

Mr. Smithers joined the Royal Naval Reserves in 1939. He contracted measles, and this was to change the course of his life. Via friends of friends, he came to the knowledge of Ian Fleming and was summoned for an interview (The Telegraph 2006). He then was recruited to Naval Intelligence and MI6. It was his association with Fleming that later led to flattery in some obituaries that he was an inspiration for James Bond (*The Telegraph*), while other dismissed



this account as pure fancy (Roth 2006). Friends would jest that he was “more green fingers than goldfingers” (*The Telegraph*). In Naval Intelligence he was posted to Mexico and Washington. In 1943 he met and married Dojean Sayman. Later he and Dojean had two daughters and raised them with Dojean’s son from a previous marriage.

After the war Mr. Smithers was elected to the UK parliament. He had his greatest domestic success with stopping plans to create a vast 4000-acre gas storage facility under Winchester (*The Telegraph*). In 1960-62 he was a delegate at the United Nations, and Under Secretary of State from 1962-64. He went on to be Secretary General for the Council of Europe from 1964 to 1969. He was nominated to a peerage, but members of his own conservative party opposed it. He was not considered Tory enough, being pro-American and the wrong sort of pro-Europe (Roth). He was knighted in 1970. However, Smithers was becoming more disillusioned with Britain and accepted an offer of Swiss citizenship from the President of the Swiss Confederation, Will Spühler (*The Telegraph*).

The relocation from Britain to Switzerland gave Sir Peter yet another opportunity to design a garden and grow new plants. He built a house inspired by Caribbean and Japanese architecture above Lake Lugano, at Vico Morcote (*The Telegraph*). Smithers, in *Adventures of a Gardener* praised the location for providing an ideal environment to grow a wide range of plants. Here he created a garden that was filled with *Magnolia*, *Rhododendron* and *Wisteria*. *The Financial Times* named it among one of the 500 greatest since Roman times (Martin 2006). He created hybrids of nerines, lilliums, and peonies by “pollen dappling” (Smithers).



Fig. 9 Nakamura 'Vico Yellow' original - photo by Helen Marriott

However, significantly for our interest, Sir Peter also went on to cross pollinate three *Clivia* x ‘Kewensis’, one a cream and two orange from the same group that he acquired from Mr. Russell at Castle Howard (Smithers) in 1971 (Dixon). These *Clivia* x ‘Kewensis’ plants trace their origins back to Charles Raffle, and a slow program of yellow gene recovery, where habitat yellow were crossed with improved orange plants (Dixon). Sir Peter describes that he grew these seedlings on under the stage in his greenhouse, but the parent cream died before the seedlings matured. When one cream plant eventually flowered Sir Peter thought it to be an improvement on the parent. In due course he sent an offset to his friend Dr. Shuichi Hiraio in Japan. Sir Peter believed that a plant was not truly enjoyed until shared (not exchanged) with a friend. In Japan this particular plant was referred to as ‘Smithers Yellow’ (Smithers p. 146) and was featured on the cover of the Japanese Horticultural Society newsletter. Sadly, Hiraio died prematurely. A couple of years later Sir Peter received a letter from Yoshikazu Nakamura. In this letter Nakamura told Sir Peter that he had received from Hiraio’s widow the yellow *Clivia* and asked for permission to use ‘Smithers Yellow’ for breeding purposes. Sir Peter wrote that he was astonished, and replied that he was free to use the plant as he wished, but perhaps could call it ‘Vico Yellow’ (p.146). This name had earlier been suggested and accepted by David Brundell in New Zealand, where Sir

Peter said it indicated both colour and place of origin (Dixon). This *Clivia* was the first to be commercially micro propagated by tissue culture by Miyoshi & Co. for commercial distribution. The results of this asexual reproduction have had mixed results in terms of identical clones of the original. Nakamura has been careful to refer to the true offsets as ‘Vico Yellow’ original to distinguish it from the tissue culture plants. Nakamura and Melbourne Clivia Group member, Shigetaka Sasaki, have extensively used the pollen from ‘Vico Yellow’ original in their breeding as the pollen is rich with good seed set and gives excellent results, particularly large well reflexed tepals (Dixon). Sir Peter was a member of the early Clivia Club that became the Clivia Society (van der Linde, p.25).

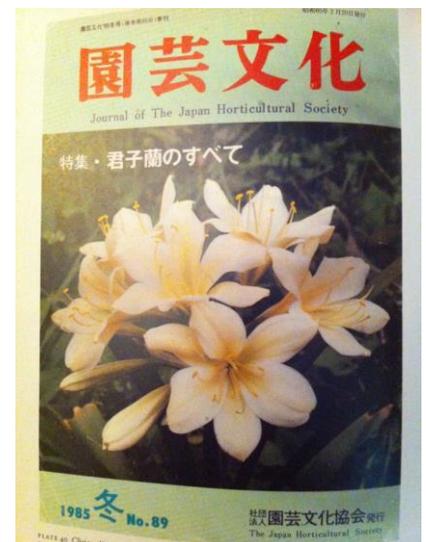


Fig. 10 Japanese Horticultural Society newsletter

Sir Peter enjoyed success with his photography of his flowers. He purchased his first Leica in 1932 (*The Telegraph*). His skill earned him eight gold medals from the RHS. The President of the RHS, Sir Simon Horby, wrote that, “Sir Peter may have some equals round the world as a gardener, but probably none as a plant photographer” (Smithers). The RHS also awarded Sir Peter one of its



highest awards, the Veitch Memorial Medal.

Sir Peter Smithers had written about a desire to end his life like his hero, Joseph Addison, and wrote that his wish was to be "surrounded by beauty, which is my garden... As long as my memory lasts my garden will remain with me, like my own past life, a delightful dream which one I dreamed here on this mountainside". Dojean, Lady Smithers, passed away in early 2006. Sir Peter passed away aged 92 on 8<sup>th</sup> June 2006 (Martin).

While the biographies outlined above show these gentlemen to have had quite distinct lives, there are a number of similarities. Both were born British citizens but died in adopted countries. Both served in WW2, and were involved in military intelligence. Both married American ladies. Both created famous gardens, and had specialist collections. Both were generous to other gardeners, and horticultural organisations. It was the act of sharing special treasured plants, in this case particularly good cream *Clivia*, which led to the wide distribution of those plants and their hybrids today. The *Clivia* fraternity is richer for their generosity and it is fitting that they are remembered frequently.

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Special thank you to Helen Marriott, L.T. Tran and Mike Riska for their contribution to this article.

## POTTING MIXES

Rae Begg

### Why do we need to use potting mixes in pots?

Because *Clivia*, and any other plants grown in pots, need well drained media which has the capacity to hold enough water and nutrients for healthy growth.

### How long do we want our potting mix to last?

Most people will say 'years' or 'as long as possible'.

For potting mix to remain stable for a long time, consideration must be given to the materials used.

### Physical properties of Potting Mixes

#### Physical properties means:

- shape, size and density of individual particles and the way particles stack together
- the stability and whether or not there is internal pore space
- eg. stone or sand vs perlite or bark.

#### These properties then determine:

- the proportion of air and water in the mix when it is drained
  - the ease with which the roots can extract water
  - the bulk density or weight of the mix. Weight is considered necessary to keep containers stable.
- Mixes must contain a high proportion of readily available water so watering can be infrequent. Thus the formula for potting mix needs to **balance air filled porosity and water holding capacity**.

#### Effects of particle size

- pores between large particles are larger than the pores between small particles
- the smaller pores will be filled with water



- the larger pores will be filled with air
- water in the largest of the smaller pores will be *readily available to the plants*
- water in the tiniest pores will be *unavailable*

#### Therefore:

- the proportions of air and readily available water in a mix will depend on the proportions of:
  - pores of different sizes.
  - many large particles should give much air in the mix
  - many small particles should give a high ability to hold water.

**The recommended air filled porosity for Clivia is about 20% or more ie. 20% of the volume of mix should be air.**

**Air filled porosity** of composted coarse mixture of pine bark (0.5mm-5.0mm) is approx 48%.

**Water released** from the same course mixture of pine bark (0.5mm - 5.0mm) is around 3%.

#### **Add sand at a ratio of 2 parts bark to 1 part sand**

- the air filled porosity is approx. 15%
  - water released is approx. 20%
- Using very fine sand
- reduces the air filled porosity to around 7%
  - reduces the water released to around 13%

Using very coarse sand increases the air filled porosity to around 28%.

- reduces the water released to around 13%.

#### **Add sand at a ratio of 10 parts bark to 1 part sand.**

- The air filled porosity is approx. 28%
- Water released is approx. 12%

Using very fine sand

- increases the air filled porosity to around 33%
- reduces the water released to around 9%

Using very coarse sand

- increases the air filled porosity to around 40%
- reduces the water released to around 8%.

**The most common materials** used in potting mixes include peat, composted bark, sand, perlite, coconut fibre and vermiculite.

**Peat** holds more readily available water than any of the others listed but has a much finer particle size so it is not suitable for use in *Clivia* potting mix.

**Coconut fibre** has:

- an air filled porosity of approx. 12.5%
- water holding capacity approx. 88%.

**Perlite** allows higher air filled porosity than similar sized particles of other materials due to the porosity of the material. This can be used for *Clivias* but other materials are cheaper.

**Coarse grades of perlite:**

- increase air filled porosity and decreases readily available water

**Finer grades of perlite:**

- decreases air filled porosity and increase readily available water.

**Particle shape** of different materials varies so the way they sit together also has an effect.

**Mixes with a good balance** between air filled porosity and the ability to supply readily available water will have approx 20% fine particles (0.1 - 0.25mm range). Higher proportions of very fine particles (like very fine sand or clay particles) will decrease the proportion of readily available water.

**Examples of general nursery mixes** based on pine bark with air filled porosity 13 - 25% and readily available water as high as possible.

#### **Materials:**

##### **Ratio**

Pine Bark

1

Pine bark: sand

2:1 to 4:1

Pine bark: sand: peat moss

4:4:1

Pine bark coarse: fine bark: sand

3:2:1 (my wholesale mix from Debco for *Clivia*)

##### **Poor mixes**

soil: pine bark: sand

7:3:1

loam: sand: sawdust

3:2:1

#### **USING POTTING MIXES**

When potting plants, don't press the potting mix down. This reduces the air filled porosity.

Normal watering is usually sufficient to settle the mix and stabilise the plant.

Garden soil, compost and other organic and animal fertilisers are not desirable in potting mix. They quickly break down into small particles reducing air filled porosity and causing drainage problems. Often pathogens in the soil which are under control in the ground become a problem in containers.

#### References:

Growing Media for Ornamental Plants & Turf

K. Handreck & N. Black NSW University Press revised edition 1989

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