

NZ CLIVIA CLUB INC

NEWZLETTER

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Dear Members and Friends

Welcome to the first NewZLetter for 2005. I am sure many of you are enjoying the 'rogue' clivias flowering now in the sometimes impetuous and sometimes fervently hot weather we are experiencing. Apologies for the slight delay in publishing. I know you will forgive us when you have read the research results! It's been an incredibly busy year so far for our Club.

The most exciting news we have in this issue, are the results of our research 'Project X – Clivia Flower Pigmentation Analysis'. Many of you attended a meeting on Thursday evening where our Chairman, Dr Keith Hammett presented the results. At last we have hard evidence that we can hybridise with the expectation of good flower colour. We also want you to know that this research (\$2500) was paid for out of funds raised by you the members, via our Seed/Plant bank and proceeds from the sale of books, raffles etc. This research is hopefully, the first of many that we as a Club will undertake. We are already planning a follow-up to Project X. We value your contributions whether they be by way of donated seed/plants or as a purchaser of these products. It can only enhance our clivianating hobby and obsession!

A big thanks also to Keith for allowing us to publish the article on 'Robusta'. Many of you have already read it, but for those who haven't and are new to the Club – delve into another uniqueness of another species.

You will note from the 'Coming Events' that we have a load on this year. We are excited to again not only have the Auckland Clivia Show, but the regionals. Last year these were well attended and many of you became new members directly from these shows. I have heard on the grapevine that many of the growers are expecting spectacular crosses to flower this year!

We are thrilled to have been asked to exhibit at the Ellerslie Flower Show in November. I am sure with so many hort clubs there this year it will be a colossal blast of colour. Please diary these dates.

Last week the Committee appointed Tony Barnes as a Committee Member. Tony brings with him a vast knowledge and experience with clivias and other plants. Many thanks to Helen Sanders. She not only won the logo competition but has contributed 'Clivia-art' throughout the NewZLetter. Enjoy her work and have a giggle at times (It's ok, no one is looking!) And finally, a special thanks to you the contributors, for your photos, articles, snippets of information, letters and emails. Keep them rolling in. This is your NewZLetter, we only collate it.

Happy Clivianating, put the billy on, rest your feet and have a good read

The Editorial Team : Di, Murray and Stuart.

2005 Coming Events

- **Gardenii & Interspecific Clivia Show** at the Akl Botanic Gardens **21 May 9am – 4pm**
Guest Speaker *Dr Rod Bielecki*
- **Annual Dinner – 21 May**
Akl Botanic Gardens – tickets available now!
- **Meeting – 23 July** at AHC Rooms 2pm – 4pm '**Variegated Clivia**' by *Rex Williams*
- **Orchid Show – Hamilton** – NZCC will be there **1st – 4 Sept**
- **AGM – 8 October at 5.30pm** **At the Akl Botanical Gardens** Your vote counts!
- **Clivia Shows – Auckland 8th & 9th October** at Akl Botanical Gardens **9am – 4.30pm**
- **Whangarei – 15th & 16th October** at **Nymet Gardens Cemetery Road**
- **Tauranga 15th October** at **Parva Plants Te Puna**
- **New Plymouth 29th & 30th October** at **Ngamamaku Gardens Oakura (first weekend of the Rhodo Festival)**
- **Ellerslie Flower Show** NZCC will be there in the marquee **16th – 20th November** at the **Akl Botanical Gardens**
- *Further details inside*

***Clivia* Flower Pigment Analyses**

Sponsored by the New Zealand Clivia Club

Experiment organised by Dr Keith Hammett
Analyses conducted by Dr Ken Markham
at
Industrial Research Ltd, Lower Hutt, New Zealand

Salient Points

Questions posed

- a. What is the relationship between red, orange and pastel (dilute orange) coloured blooms ?
- b. What is the relationship between dilute orange and peach colouration ?
- c. What is the relationship between dark yellow and palest cream ?
- d. Can putative Type I and Type II yellows be distinguished on the basis of flower pigment analyses ?
- e. Do pendulous species such as *C. nobilis* and *C. caulescens* have similar pigment profiles to *C. miniata* ?
- f. If so can these parents be detected in interspecific hybrids ?

Analyses not requested

- a. Presence or absence of chlorophyll, the only green pigment found in plants.
- b. pH of each sample.

Limitations

- a. Need to obtain a range of samples at the same time and to send these quickly to Wellington.
- b. Pigment is not evenly distributed either within or between tepals.
- c. The colour of tepals is seen to change as they age.

Methods

- a. Tepals were removed from fully opened mature, but fresh flowers, and sent for analysis on Monday 11 October 2004.
- b. Ideograms were prepared indicating colour chart readings of perceived areas of colour for both inner and outer surfaces of both petals (broad) and sepals (narrower).
- c. Separate recordings were made using the Cape Clivia Club (CCC) and the Royal Horticultural Society (RHS) colour fan 1966 edition. In many cases the ranges of colours on the CCC chart were inadequate to make a recording.

Chemical Analyses

- a. Petals were organised into samples of comparable weight.
- b. Samples were ground and pigments extracted in appropriate solvents.
- c. Carotenoid pigments were estimated by absorption spectroscopy.
- d. Anthocyanin pigments were estimated by:
 - a. Absorption spectroscopy.
 - b. Two-dimensional paper chromatography examined under UV light.

Results

Samples were supplied numbered at random so the analyses were carried out blind. The analyst had no knowledge of the questions until the analyses were finished.

The results have been reordered in the table to reflect the questions posed. Numbers 1-6 in column 4 represent a progression from darkest red to palest dilute orange.

The original clonal 'Chubb's Peach' is compared with a derived peach at positions 7 & 8.

Positions 9 & 10 compare a dark yellow with a very pale cream, while 11 is a putative Type II yellow.

Single accessions of the species *C. nobilis* and *C. caulescens* are compared at positions 12 & 13, while hybrids involving these taxa are shown at positions 14 & 15.

Examples of absorption spectra for carotenoid pigments are presented in the graph.

Discussion.

It has been established previously that Clivia flowers have a dual pigment system. Yellow colouration is the result of carotenoid pigments. These may be thought of as oil paints. They occur in deeper cell layers and are contained in little sacks called plastids.

Unlike many other flowers, Clivias do not have water based yellow flavonoid pigments.

The surface layers of cells contain the red/blue water soluble anthocyanin pigments so that when we look at an orange coloured Clivia flower, we are looking at a yellow background through a red filter.

Yellow Clivias have been recognized as having lost the ability to produce the red pigments. This can be clearly seen in the table where the yellow Clivias show no anthocyanins at all.

The dark yellow Clivia 'BLY' shows the highest level of carotenoid pigment while the palest cream shows a very low level and has virtually lost the ability to produce any pigments. This bodes well for the production of a near white flowered Clivia.

It is not possible to distinguish between putative Type I and Type II yellows from these analyses.

In the red/orange series the darkest red Clivia 'Nakamura Crimson' has both more anthocyanin pigments and greater concentrations of these, plus a high level of yellow carotenoid pigments. The potentially blue pigment Anthocyanin 3 (D-monoglyceride) is well represented which suggests that if pH were to rise, purple colouration might be possible.

At the other end of the spectrum, 'Tony's Pastel' has greatly reduced levels of all pigments.

'Nakamura's Bronze' owes its bronzing to the presence of chlorophyll, although analyses were not carried out to determine the levels of this pigment.

The peaches are interesting as they indicate that although anthocyanin pigments were not easily visible on the paper chromatograms they were present at very low levels and are still acting as visual filters. The ratio of carotenoids to anthocyanins is very high, even if the carotenoid levels themselves are not especially high.

In as much as Tony's Pastel has been obtained by serial backcrossing to yellow, the data suggest that if this process were continued, perhaps using a dark yellow, peach colouration might be obtained by this route. There is no evidence from our data to support the hypothesis

of peach colouration being a distinct single gene mutation comparable to that causing yellow colouration.

Although in the table, the data for carotenoids are presented as if it were a single pigment, like the anthocyanins, it is made up of different components. These can be seen in the carotenoid spectra graph. The *C. miniata* cultivars 'Chubb's Peach' and 'BLY' have essentially the same profile although the level of 'Chubb's Peach' is half that of 'BLY'. The pattern for 'Nakamura Bronze' is however a surprise as this was considered to be a pure *C. miniata* cultivar. However, the peak at 416 nm is characteristic of *C. nobilis* (not shown) and the trace is that of a *C. nobilis* x *miniata* hybrid. Presumably the strong chlorophyll component of 'Nakamura Bronze' comes from *C. nobilis* ?

In a similar way, the hybrid nature of 864/04 and 'Armani' is reflected in their carotenoid spectral patterns. This will be reported more fully later.

This single set of analyses on just 15 samples has expanded our knowledge of *Clivia* flower pigmentation, but was essentially a range finding exercise. We are now in a better position to resolve more critical questions. For example the question of pigment expression in relation to cell pH might be explored, while the use of other techniques might resolve whether there is a fundamental difference between putative Type I and Type II yellows and between dilute oranges and peach.

There are strong clues for breeders in the data. Darker yellows, near white cultivars, darker reds and purplish tones appear obtainable, given patience and time. The potential offered by interspecific hybridization has been clear for some time. However the data presented here show that they offer both new pigments as well as variation in flower shape and pigment patterns.

The complexity of the interaction of different pigment systems in *Clivia* underlines the naivety of attempting to construct simplistic genetic models of colour inheritance with no understanding of the physiological and developmental mechanisms that lead to perceived colour in *Clivia* flowers.



'Natal Yellow – Type 2 ' – Alick McLeman
Photo by A. McLeman



'Alicks Peach ' – Alick McLeman
Photo by A. McLeman

	Name/Code	Observed Petal Colour	Carotenoid:anthocyanin (C:A ratio)			2D-PC Visible Components***						
						Anthocy-1 (P-monoglyc)	Anthocy-2 (P-diglyc)	Anthocy-3 D-Monoglyc)	HC-1	HC-2	HC-3	Flavones/ols
1	Nakamura Crimson	Dark Red	1	8.2	1.61 (5.1)	+++	+++	++	p			-
5	Nakamura Bronze	Bronzed Red	2	5.6	0.88 (6.3)	+++	+++		p			-
11	8319/04 Grandiflora (sic)	Stronge orange German hybrid	3	2.9	1.12 (2.6)	+++	++		p			-
14	NZ miniata	Pale Orange	4	3.2	0.35 (9.1)	+	+	w	p	p		-
8	Peach Melba	Mid Pastel (Dilute orange)	5	4.2	0.21 (20)	+	+	+	p	p		-
4	Tony's Pastel	Palest Pastel (Dilute orange)	6	2.8	0.09 (31)	+	+		p	p	p	-
6	Chubb's Peach	Original Peach mutation	7	4.8	0.07 (68)	w			p	p		-
3	Alick's Peach	Derived Peach	8	3.8	0.06 (63)				p	p		-
7	BLY	Dark yellow	9	9.6	-				p	p	p	-
10	8160/04 Palest yellow	Palest yellow	10	1.4	-				p	p		-
2	Natal Yellow	Putative type 2 yellow	11	7.2	-				p	p	p	-
12	<i>C. nobilis</i>	Species	12	2.8	0.47 (6.0)	w	++		p			-
15	<i>C. caulescens</i>	Species	13	1.4	0.09 (16)	w			p			-
9	864/04 <i>C. caulescens</i> x mi	Interspecific hybrid	14	2.3	0.25 (9.2)	+	++	w	p	p	p	-
13	Armani	Interspecific (<i>C. nobilis</i> x <i>miniata</i> ?)	15	2.8	0.33 (8.5)	++			p	p	p	-

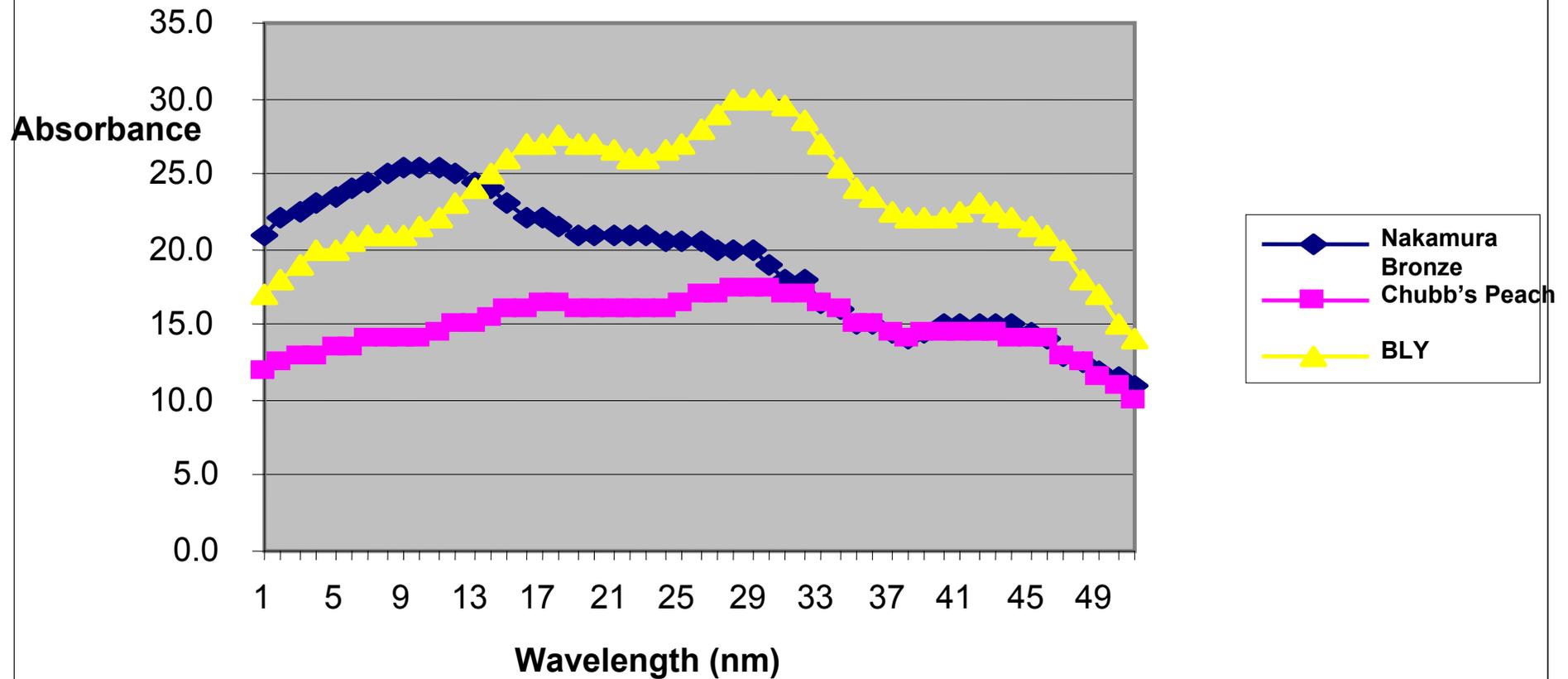
Notes

*Carotenoids expressed as *B*-carotene equivalents in mg/g of live petal x1000.

**Anthocyanins expressed as pelargonidin-3-glucoside equivalents in mg/g of live petal. Carotenoid:Anthocyanin (C:A) ratio in parentheses.

***P=pelargonidin-like; D=delphinidin-like; HC=hydroxycinnamic derivative; + =relative level; p=present; w=v

Carotenoid Spectra



CLIVIA SHOW SCHEDULES

✚ AUCKLAND – 21 MAY 9AM – 4PM GARDENII & INTERSPECIFIC SHOW Auckland Botanical Gardens, Manurewa

- Clivias on display. See the new hybrids and beautiful colours
- Dr Rod Bieleski is guest speaker
- Annual Dinner in the evening ! Tickets \$25 available NOW !

✚ AUCKLAND – 8TH & 9TH October 9AM – 4PM Auckland Botanical Gardens, Manurewa Entry \$3

- Clivias on display. See the new hybrids and beautiful colours
- Take in a lecture or workshop. An opportune time to have all your questions answered by the resident experts. Find out how to look after your clivia, get rid of those pesky bugs, nutrition, learn about the natural habitat of clivia in South Africa, identify all the species.
- Sellers. Here is your opportunity to take home a wonderful clivia plant to enhance your patio or garden from the best clivia growers in New Zealand. The sellers this year will include : David Brundell (Gardenza), Ian and Barbara Duncalf (Parva Plants), Keith Hammett; Peggy & Rob Pike, Joy Plants (Terry & Lindsey Hatch) plus more

✚ WHANGAREI - 15th & 16th October 9am – 4pm Nymet Gardens, Cemetery Road, Whangarei

- Clivias on display. Plants to buy
- Check out and enjoy the ambience of the beautiful gardens of Jean and Colin Sanders

✚ TAURANGA – 15th October 9am – 4pm Parva Plants, Te Puna Road, Te Puna Tauranga

- Clivias on display. Last year was a resounding success and many of you visited. Again the display and sales will be in the large shed at Parva Plants (Ian & Barbara Duncan), so weather is not an issue at all. Ian and the other sellers will have their new hybrids on display.
- Talk a long slow walk around the manicured gardens and enjoy the large population of clivia plantings

✚ NEW PLYMOUTH - 29th & 30th October 9am – 4pm Ngamamaku Gardens 1521 Surf Highway Oakura

- Only a few minutes south of New Plymouth. Drive through the tiny settlement of Oakura and a few hundred metres on the left is Ngamamaku Gardens (look for the sign by the road). An awe-inspiring garden owned by Tony and John. This is the first weekend of the famous Rhodo Festival, so not only enjoy the clivias, but also the Taranaki rhododendrons. Tons to do and sights to see.
- Clivias on display in the Summer House. See the new hybrids and beautiful colours
- Take a walk around the gardens, down by the stream see all the clivia underplanting. You will be inspired to buy the clivias on sale from the growers and breeders and plant them in your own little spot of paradise. Tony is also a rose and camellia expert, so the garden is full of surprises and excitement!

GARDENII (& Interspecifics) SHOW & DINNER – 21 May 2005

Keep Saturday May 21 free for the Annual Gardenii Show. Following the show, we will be holding a 'Winter Solstice Dinner' More information will be available in the NewZLetter at the beginning of next month.

Mid- Year Dinner Spectacular – Tickets \$25 per person. Includes 3 course dinner with wine and orange juice

Guest Speaker during dinner

Be part of the fun of the Club and book your Dinner ticket now.

Send your chq made payable to NZ Clivia Club to The Secretary, 71 Taylor Road, Mangere Bridge Auckland



VARIEGATED CLIVIAS - Speaker Rex Williams (from Tauranga) 2pm 23rd July at AHC Rooms, 990 Gt North Road, Western Springs, Auckland

Rex Williams has been in the horticultural arena since his mid-teens. Many of you will know of him through his expertise with vireyas, palms and cycads. He also has an extensive planting of hybridised clivias on his own property and is especially interested in the variegated forms.

Rex will speak on variegated clivias – how they happen, why they happen, how to breed for them, why they are collectible and sought after. Participate and learn all about this aspect of clivia growing so you can enhance your own Clivia collection.



PERMANENT MARKING YOUR LABELS

When is permanent not so permanent? When you use a permanent marker pen? We sent Alick McLeman out to do a spot of experimenting. Here is his report ...

The problem with clivia is they take so long to flower, often far longer than the lifetime of the permanent inks in marker pens, and so labelling can be a problem. On a number of occasions I have suffered the frustration of being unable to identify a plant because the label faded. The permanent inks look great to start with but seem to have a sell-by date of about 2 years, after which they fade almost overnight.

When I first started growing clivia I used to cut up ice-cream & margarine cartons for labels to stake in pots. Experience has taught me that these can become extremely brittle after a year or two. I now prefer to use commercial 'stake type' white labels available through garden centres and horticultural suppliers. They are very long lasting and worth the small expense involved.

But what to mark them with? I heard of using a pencil, but I couldn't seem to find pencils that would mark the plastic effectively. Then recently a specific pencil was suggested, a 'Staedtler Noris-Maxi 827-6B'. Success at last!

This is a childrens' trainer pencil with a broad, soft lead which marks the smooth plastic labels very effectively. I am assured by others who have been using the pencil for years that it is really 'permanent'. The person I spoke to at Staedtler was not aware of its special properties, but later informed me that their sales people were aware that the pencil was extensively used by 'farmers' for marking purposes.

Staedtler also inform me that they have developed a new ink with a life of 7 years which they use in their "Lumocolor permanent special F" pens. This might be worth trying, but the pencils are far cheaper.

How about writing in and telling us the innovative ways you are labelling your special plants?

' PROJECT X – CLIVIA PIGMENTATION ANALYSIS MEETING

Last Thursday evening a broad spectrum of members met to hear the results the latest Club sponsored research. This was a well attended meeting where Keith Hammett explained how the Pigment Analysis results would benefit all clivia enthusiasts. Read the results (page 2) and see for yourselves how hybridising has had the guessing taken away. The raffles were well received and Mary and Bev, as per usual, put on a wonderful supper – thanks to all who attended (especially those from out of Auckland)

The Committee is now working hard to raise funds for further research assignments to assist us all in our clivia growing.

Photo : Keith explains the carotenoids and anthocyanins ratios in the clivias



A new species of *Clivia* (Amaryllidaceae) endemic to the Pondoland Centre of Endemism, South Africa

B. G. MURRAY ¹FLS^{1*}, Y. RAN², P. J. DE LANGE ³FLS³, K. R. W. HAMMETT⁴, J. T. TRUTER⁴ and Z. H. SWANEVELDER⁵

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Clivia robusta B.G. Murray, Ran, de Lange, Hammett, Truter et Swanevelder **sp. nov.** (Amaryllidaceae) is a tubular, pendulous-flowered *Clivia* species, restricted to the Pondoland Centre of Endemism, South Africa. The unique morphology, distribution, karyotype and molecular fingerprint distinguish it from all other pendulous-flowered species in the genus. © 2004 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2004, 146, 369–374.

ADDITIONAL KEYWORDS: *Clivia gardenii* – Haemantheae – taxonomy.

INTRODUCTION

Clivia Lindl. (Amaryllidaceae), with five described species, falls within the African tribe Haemantheae (Meerow *et al.*, 1999; Rourke, 2002a). It is indigenous to South Africa and Swaziland and forms part of the southern Africa centre of diversity for the family Amaryllidaceae (Meerow & Snijman, 1998; Snijman, 2000).

This perennial genus is well known for growing in diverse habitats ranging from coastal forest and secondary coastal dunes, to swamps, riverbanks and rock scree; specimens are even reported to grow as epiphytes in some localities. The genus generally favours cool, shaded, well-drained habitats with the exception of *C. mirabilis* Rourke, which is found in a semi-arid area with a Mediterranean climate. The genus is linked directly to the inland and coastal Afrotropical forests of southern Africa, with *C. mirabilis* found in relictual evergreen Afrotropical forest elements in the south-western corner of the Northern Cape prov-

ince, South Africa (Duncan, 1999; Winter, 2000; Rourke, 2002a, b).

In July 1960, W. L. Chiazzari deposited specimens of an unidentified *Clivia* species at the National Botanical Institute (Pretoria) (PRE 37056 and PRE 37058). These specimens were later identified as *C. gardenii* Hook., with the differences in morphology attributed to natural variation. Subsequently, chromosome and DNA sequence analysis by Ran and coworkers (Ran, Murray & Hammett, 1999, 2001; Ran, Hammett & Murray, 2001a, b), carried out to establish relationships between and within species, further showed that plants identical to Chiazzari's specimens and known in horticulture as the 'robust form' of *C. gardenii*, 'Swamp Forest *Clivia*' or 'Robust *gardenii*' (Hammett, 2002) had a distinct karyotype and unique DNA marker pattern. The chromosome studies used Giemsa C-banding, fluorochrome banding with DAPI (4'-6-diamidino-2-phenylindole) and CMA (chromomycin A3), which preferentially bind to AT- or GC-rich regions of the genome, respectively, and the location by fluorescent *in situ* hybridization (FISH) of the 45S and 5S rRNA genes to identify the chromosomes of the complements.

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Little intraspecific karyotype variation was observed and all the described species plus 'Robust *gardenii*' could be identified on the basis of their karyotypes (Ran *et al.*, 1999, 2001b). Two different approaches were used to investigate the phylogeny of the group. DNA sequences from the nontranscribed spacer between the nuclear 5S rRNA genes and the internal transcribed spacer of the 45S rRNA genes and the RAPD (random amplified polymorphic DNA) profiles were used to construct phylogenetic trees. In all cases 'Robust *gardenii*' was sister to *C. gardenii* and *C. miniata* Regel (Ran *et al.*, 2001; Ran *et al.*, 2001b). Further investigation indicated that these plants have a distinct morphology, but appear to be closely related to *C. gardenii*. In tandem with the unique karyotype and DNA profiles, the morphological characters amply distinguish these plants from *C. gardenii* and all other known *Clivia* species. We therefore recognize these plants herein as a distinct taxon at the rank of species.

MATERIAL AND METHODS

Plants of 'Robust *gardenii*' were grown outdoors in Auckland, New Zealand from seed collected from seven localities in the Pondoland Centre of Endemism, Transkei, South Africa. The localities were: (1) Nkamabati Nature Reserve, subsequently cultivated at Kirstenbosch Botanic Garden, Professor Kobus Eloff (133/86); (2) near Lusikisiki at the Fraser Falls, S. Venter (885); (3) swamp at Mkamabati, M. Dower (8985); (4) Lambasi Village, KRW Hammett, J. Winter & J.P. Rourke (81141); (5) Dimfi, between Ndindindi and Mkamabati River mouth, KRW Hammett, J. Winter & J.P. Rourke (8144); (6) Umtamvuna Nature Reserve, KRW Hammett, J. Winter & J.P. Rourke (81147); (7) cultivated material ex. A. McLeman.

Material from natural populations was collected in accordance with the rules and regulations of the particular provinces and with permits from Ezemvelo KwaZulu-Natal Wildlife, South Africa (permits, 27110/2001, 30443/2002 and 966/2003) and Department of Economic Affairs, Environment and Tourism, Province of the Eastern Cape, South Africa (General Permit 01/07/2001). Seeds and plants in South Africa were grown outdoors and under shade netting.

In addition to field observations, we supplemented our knowledge about the environment, habitat and natural populations of 'Robust *gardenii*' through correspondence with *Clivia* enthusiasts familiar with the species. Data supplied by these individuals were verified by comparison with available herbarium records.

Measurements of morphological features were made from random samples selected in the different populations and compared with observations made by the enthusiasts. These are given as ranges with outlier values given in brackets. Observations and measure-

ments from live plants were made from cultivated material grown from seed collected from throughout the distribution range of the species.

DESCRIPTION OF NEW SPECIES

CLIVIA ROBUSTA B. G. MURRAY, RAN, DE LANGE, HAMMETT, TRUTER & SWANEVELDER SP. NOV.

Diagnosis: *Clivia gardenii* Hook. affinis sed qua habitu robustiore majoribus, apicibus foliorum apiculatis, staminibus et pistillis inclusis, habitatione silva palustri anteferenti, et ab omnibus aliis speciebus generis *Clivia* karyotipo chromosomatum et ordinationibus DNA indicibus differt.

Holotype: [South Africa]; Eastern Cape, Transkei, Port St. Johns, Mt. Sullivan (Topo. Ref. 3128 UMTATA 1:250 000); southern flanks of mountain, growing in wet seepage on ledge against cliff face, roots in humus and leaf mould, 100–200 m, 1.1.2001, J.T. Truter 4072 (PRU).

Description: Perennial plant, stout, rhizomatous, solitary or clumping, evergreen, 0.5–1.6 m tall; stem reduced to a vertical rhizome \leq 400 mm long, terminating in a tuft of leaves. ROOT SYSTEM massive, horizontally spreading. ROOTS perennial covered in a corky, velamen-like layer. 'Stilt/butress' roots produced along the stem in swampy conditions. Root diameter 5–15 mm. LEAF SHEATH green to light red. LEAVES long-lived, arching-erect, distichous, strap-shaped, 0.3–0.8(–1.5) m \times 40–70(–90) mm, glabrous, alternate, 6–10 leaves per rhizome, broadly linear to linear-oblongate, coriaceous, weakly canaliculate, base markedly plano-convex, broadening and becoming planar from midsection to obtuse apiculate apex. Lamina of adaxial surface dark green, pale whitish grey striation in the mid-rib area may be present, becoming less distinct in older leaves; abaxial surface markedly paler green, lamina margin entire with extreme distal portion slightly scabrid, teeth antrorse. SCAPE hermaphrodite, up to 0.8–1 m long, subterete, somewhat laterally compressed, ellipsoid, grooved with weakly developed median ridge, green, flushed pinkish red, flecked pale yellow or cream. Inflorescence an umbel, form variable, usually loose and tending to globose, with 15–40(–45) flowers subtended by two chartaceous, deciduous, lanceolate bracts 30 \times 40 mm. PEDICELS stiff, erect/suberect, slender 15–60 \times 1.2 mm, green but variable. PERIANTH tubular, somewhat falcate with an increasingly flaring apex, 30–55 \times 5 mm, widening to 6–13(–20) mm diameter at mouth. Colour variable from dark orange-red, with red tips, through pale orange to pink orange; rarely yellow in some plants with light to dark green apices. Perianth segments (tepals) 6, united only at the

base, otherwise overlapping, decurved, slightly asymmetrical, oblanceolate, infundibuliform, slender, involute, dilated at apex to form a somewhat thickened lip; apiculate at apex, the apiculum finely covered in white hairs. STAMENS 6, adnate to perianth, one per segment, usually included within perianth tube, very occasionally extending to, and exceeding the perianth mouth. Filaments 30–35 mm long, white, terete, glabrous. ANTHERS 6, versatile, 3–4 × 1–1.5 mm oblong dorsifixed, 2-locular; pollen yellow. STYLE: 28–35(–50) mm, terete, glabrous, included within perianth tube. STIGMA tri-lobed, 5 mm terete, approx. glabrous, usually with sparse, fine, white cobwebbed hairs scattered along inner surfaces, distal portion pale green to pinkish-green, finely papillate near apex. Stigma occasionally protrudes from tip of perianth tube prominently. OVARY subglobose, dark-greenish in bud, remaining that colour at anthesis, changing to green-orange colour after pollination; 3-locular. Fruiting heads with (1–)10–20(–35) pendant berries. BERRIES irregularly ovoid, 15–40 × 10–20 mm, globulose, containing 1 or 2(–4) large seed (largest in genus), prominently projecting through thin pericarp. Pericarp glossy, pale green, maturing through orange to bright red. Yellow-flowered clones produce yellow or mustard-coloured berries. SEED large, somewhat globose, 10–18(–20) mm diameter, white in colour. EMERGING SEEDLINGS the most robust in the genus exhibiting rapid growth. FLOWERING TIME extended over 5–6-month period from late March to early August, i.e. early autumn to late winter (Southern Hemisphere); 9–12 months for seed to ripen and berries to fall off. CHROMOSOME NUMBER $2n = 22$.

Habitat: Afromontane Forest in the Pondoland Centre of Endemism, 0–500 m.

Material examined: SOUTH AFRICA: *Lusikisiki District, Lombazi River, North of Port St. Johns:* Chiazzari

3129BD (PRE); *Transkei, Ntsubane, Mkozi river valley:* Venier 76/885 (PRE). CULTIVATED ex South Africa: *Transkei, Nkombati Nature Reserve:* Hammett 133/86 (AK) (specimen over four sheets).

Etymology: The species epithet 'robusta' refers to the massive nature of the plant compared to other species in the genus.

Distribution: *C. robusta* is endemic to the east coast of South Africa, with its distribution as isolated populations from Port St. Johns in the south (Eastern Cape Province) to Mzimkulu River in the north (KwaZulu-Natal) (Swanevelde, 2003), with a few northern outliers at Oribi Gorge, Paddock, Umtentweni, Southport and one southern outlier just south of Port St. Johns. This region is known as the Pondoland Centre of Endemism (Van Wyk, 1994; Van Wyk & Smith, 2001).

Karyotype studies: The unique karyotype initially observed in material collected from Nkambati Nature Reserve, subsequently cultivated at Kirstenbosch Botanic Garden and illustrated in Ran *et al.* (2001b) was also observed in the additional material from the locations listed above in Material and Methods. There are two key features of the *C. robusta* karyotype that differentiate it from that of *C. gardenii*. In *C. robusta* there are two 45S rDNA sites compared to one in *C. gardenii*. One of these sites shares a common location in the two species (on chromosome 2) but in *C. gardenii* it is associated with a Giemsa C-band that is absent in *C. robusta*. The second site in *C. robusta* is on chromosome 8 and is also associated with a C-band.

Recognition and relationships: The key characters that distinguish *C. robusta* from *C. gardenii* are summarized in Table 1 and elaborated upon here. Morphologically, *C. robusta* is distinguished by being extremely robust; specimens approach 1.5–2 m in

Table 1. Summary of the key differences between *Clivia gardenii* and *C. robusta* sp. nov.

	<i>C. gardenii</i>	<i>C. robusta</i>
Morphology		
Habit	Gracile plant, strongly clump-forming, ≤1 m in height	Massive plant with stout rhizome, often with prop roots, ≤2 m in height
Leaves	Linear-acuminate, strongly sukate in cross-section	Broad, strap-shaped with obtuse-apiculate apex, planar in cross section
Flowers	Stigma and stamens strongly exerted	Stigma barely protrudes and stamens usually retained within corolla tube
Karyology	45S rDNA site + C-band on chromosome 2 No 45S rDNA site or associated C-band chromosome 8	45S rDNA site but no C-band on chromosome 2 45S rDNA site + C-band on chromosome 8
Distribution	Widespread in KwaZulu-Natal	Confined to Pondoland Centre of Endemism

height (Fig. 1). The very long, broad leaves, abruptly rounded leaf apex with fine serrations (Fig. 3), pale whitish-grey striation occasionally present in the upper leaf midrib, stigma and anthers largely included within the perianth (Figs 2, 4), as well as prominent 'buttress/stilt' roots (Fig. 5) in swamp populations, amply distinguish this from all other known *Clivia* species. This is the only species in the genus that seems to prefer perennially wet, swampy habitats (Fig. 6) or damp seepages on rock ledges. However, the allied *C. gardenii* does occasionally grow along stream edges or in wetter than usual habitats. Botanically, *C. robusta* was regarded as part of *C. gardenii* although it has commonly been confused with other species also. For example, Vorster (1994) used *C. robusta* to illustrate *C. nobilis* Lindl.

Using a variety of chromosome techniques, DNA fingerprinting and sequencing, Ran and coworkers (Ran *et al.*, 1999, 2001; Ran *et al.*, 2001b) showed that 'Robust *gardenii*' was sufficiently distinct from the other species to justify naming it as a new species. 'Robust *gardenii*' was sister to *C. gardenii* and *C. miniata* (Lindl.) Regel in their phylogenetic trees based on the two regions that were sequenced and on the RAPD profiles.

Clivia robusta is also distinct from *C. gardenii* with regard to its distribution. Swanvelder (2003) showed that the plant named here as *C. robusta* formed one of three geographically distinct groupings apparent from an examination of herbarium specimens collectively treated as *C. gardenii*. *Clivia robusta* is one of these groups and its distribution is distinct from that of *C. gardenii* s. s., which is only recorded from the Durban area northwards; no records connect the different distribution regions.

Ecology: The vegetation of the Pondoland Centre of Endemism consists mainly of grassland plateau, with a few isolated forest patches in the protected riverine gorges that occasionally spill over onto south- and south-west-facing slopes. Forest is more extensive and exposed in the south of the region. Of all the forest types in this region, Swamp Forests are the most rare, usually comprising small patches associated with marshy areas in grassland. *Clivia robusta* is found in these Swamp Forest patches, either sparsely (c. 5–6 plants 10 m⁻²) or in extremely dense stands (c. 20 plants 10 m⁻²) in wetter areas.

Buttress roots, along intervals on the vertical rhizome, act as support for the larger individuals growing in this marshy environment. The swamps are never stagnant: water moves through these specialized systems, albeit very slowly. The wet soil has a high content of rotting humus and leaf debris. The new species is also found along stream banks where the soil is often moist or wet, but not swampy. Fieldwork has confirmed that the species also grows in seepage on cliff faces and also relatively dry rocky areas adjacent to the wet swamps. In these situations, plants are noticeably 'stockier'. In all localities, the plants are found under a high understory of closed canopy trees in light to semi-shade.

The Pondoland Centre is highly diverse, with approximately 1800 specific/intraspecific taxa residing within its boundaries, of which 120 are endemics or near-endemics (Van Wyk & Smith, 2001). This 1880 km² large outcrop of Msikaba Formation sandstone is characterized topographically by rugged plateaus (100–500 m a.s.l.) that are deeply dissected by narrow river gorges in which isolated forest patches, with mixed tropical and Afrotropical elements, are confined. Annual rainfall varies from 1000 to 1200 mm and occurs mainly in the summer months, with a mean annual temperature of 20 °C along the coast. Soils in this centre are usually sandy, acidic, highly leached and often shallow (Van Wyk, 1994; Van Wyk & Smith, 2001).

The conservation status of *Clivia robusta*: Human exploitation in the form of habitat destruction and illegal removal of specimens is the main threat to *Clivia* in the wild. Habitat destruction occurs as forests are removed for fuel, agricultural purposes and/or urbanization (Chubb, 1996; Duncan, 1999). Plant collection for medicinal purposes is probably the most serious threat (Chubb, 1996; Duncan, 1999; Lötter & Krynauw, 2002). The high demand by traditional healers for *Clivia* plants was clearly evident when Mander (1998) identified *C. miniata* as the tenth most sought after medicinal plant traded in Durban, KwaZulu-Natal. Williams, Balkwill & Witkowski (2001) found *Clivia* species in 70% of the Witwatersrand 'muff' shops they surveyed. A. Hardinge (pers. comm.) confirmed that the same factors are also threatening the survival of *C. robusta* populations, with only remnants of some remaining.

Figures 1–6. Fig. 1. *Clivia robusta* sp. nov. growing at Kirstenbosch Botanic Garden, South Africa to show plant size. Fig. 2. Inflorescence of *C. robusta*. Fig. 3. Leaf apices of (left to right) *C. nobilis*, *C. miniata* (narrow leaved variant), *C. miniata* (broad leaved variant), *C. gardenii*, *C. robusta* and *C. caulescens*. Fig. 4. Single flower of *C. robusta* (centre) with flowers from four different accessions of *C. gardenii*, two on each side, showing the clear difference in stamen exertion between the two species. Fig. 5. *C. robusta* growing at Untamvuna showing stilt roots. Fig. 6. *C. robusta* growing in water at Lambasi.



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At present, most *Clivia* species are classified as Lower Risk-Least Concerned, Lower Risk-Near Threatened and Vulnerable (Golding, 2002; Lötter & Krynanuw, 2002). This seems insufficient when one considers the restricted ecological niche, geographical distribution and current exploitation. Swanevelder (2003) proposed that plants treated here as *C. robusta* should be categorized as Endangered (EN) B1a +2a (according to 2001 IUCN Red List Categories, Version 3.1, as in (Golding, 2002)).

The survival of *C. robusta* is constrained by its limited geographical distribution and human exploitation. Limited to the Pondoland Centre of Endemism, this species is further restricted to microhabitats usually associated with patchy Afromontane forest elements (Swanevelder, 2003). Afromontane Forests occupy c.6000 km² of South Africa and Swaziland of which only 17.64% are conserved (Lubke & McKenzie, 1996). Even though *C. robusta* distribution may be termed 'locally abundant', communities are restricted to specific ecological niches (Swanevelder, 2003).

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REFERENCES

- Chubb S. 1996. *Clivia* conservation. *Clivia Club Newsletter* 5: 8-9.
- Duncan G. 1999. Grow *Clivias*. In: Snijman D, Voget C, eds. *Kirstenbosch Gardening Series*. Cape Town: National Botanical Institute, Kirstenbosch, 1-45.
- Golding J. 2002. *Southern African plant red data lists 14*. Pretoria: SABONET.
- Hammett KRW. 2002. Swamp *Clivia*. In: Winter J, Dower M, Felbert C, eds. *Clivia Threes*. Cape Town: Clivia Society, South Africa/ Kirstenbosch National Botanical Garden, 60-72.
- Lötter M, Krynanuw S. 2002. Economically important medicinal plants. In: Emery AJ, Lötter M, Williamson SD, eds. *Determining the conservation value of land on Mpumalanga*. Nelspruit: Mpumalanga Parks Board, 75-83.
- Lubke R, McKenzie B. 1996. Afromontane forest. In: Low AB, Bobelo AG, eds. *Vegetation of South Africa, Lesotho and Swaziland*. Pretoria: Department of Environmental Affairs and Tourism, 12.
- Mander M. 1998. *Marketing of indigenous medicinal plants in South Africa: a case study in KwaZulu-Natal*. Rome: Food and Agriculture Organisation of the United Nations.
- Moerow AW, Snijman DA. 1998. Amaryllidaceae. In: Kubitzki K, ed. *The families and genera of vascular plants*. 3. Berlin: Springer Verlag, 83-110.
- Moerow AW, Foy MP, Charles LG, Li QB, Zaman FQ, Chase MW. 1999. Systematics of Amaryllidaceae based on cladistic analysis of plastid *RBCL* and *TRNL-F* sequence data. *American Journal of Botany* 86: 1325-1345.
- Ran Y, Hammett KRW, Murray BG. 2001a. Hybrid identification in *Clivia* (Amaryllidaceae) using chromosome banding and genomic *in situ* hybridisation. *Annals of Botany* 87: 457-462.
- Ran Y, Hammett KRW, Murray BG. 2001b. Phylogenetic analysis and karyotype evolution in the genus *Clivia* (Amaryllidaceae). *Annals of Botany* 87: 823-830.
- Ran Y, Murray BG, Hammett KRW. 1999. Karyotype analysis of the genus *Clivia* by Giemsa and fluorochrome banding and *in situ* hybridisation. *Euphytica* 106: 139-147.
- Ran Y, Murray BG, Hammett KRW. 2001. Evaluating genetic relationships between and within *Clivia* species using RAPDs. *Scientia Horticulturae* 90: 167-179.
- Rourke JP. 2002a. *Clivia mirabilis* (Amaryllidaceae: Haemanthaceae) a new species from Northern Cape, South Africa. *Bothalia* 32: 1-7.
- Rourke JP. 2002b. The miraculous *Clivia* - an astonishing new species from the arid Northern Cape. In: Felbert C, van der Linde J, Winter J, Dower M, eds. *Clivia Four*. Kenilworth: Clivia Society, South Africa, 5-12.
- Snijman DA. 2000. Amaryllidaceae. In: Leistner OA, ed. *Seed plants of southern Africa: families and genera. Stralitzia 10*. Pretoria: National Botanical Institute, 570-576.
- Swanevelder ZH. 2003. Diversity and population structure of *Clivia miniata* Lindl. (Amaryllidaceae): evidence from molecular genetics and ecology. Unpubl. MSc thesis, University of Pretoria.
- Van Wyk AE. 1994. Maputland-Pondoland region. In: Davis SD, Heywood VH, Hamilton AC, eds. *Centres of plant diversity. A guide and strategy for their conservation 1*. Cambridge: IUCN Publications Unit, 227-235.
- Van Wyk AE, Smith GF. 2001. *Regions of floristic endemism in Southern Africa. A review with emphasis on succulents*. Hatfield: Umdaus Press.
- Vorster P. 1994. *Clivia nobilis*. *Flowering Plants of Africa* 53, 12094: 70-74.
- Williams VL, Balkwill K, Witkowski ETF. 2001. A lexicon of plants traded in the Witwatersrand *umuthi* shops, South Africa. *Bothalia* 31: 71-98.
- Winter J. 2000. The natural distribution and ecology of *Clivia*. In: Dower M, Felbert C, Winter J, eds. *Clivia yearbook 2*. Cape Town: Kirstenbosch National Botanical Garden, 5-9.

MORE THAN ONE WAY TO SKIN A CLIVIA !

It is amazing the amount of correspondence on the various e-groups, newsletters and even in the Clivia Society newsletter on the topic of how to germinate seeds. If one thing is sure, it is that there are numerous methods or recommendations exchanging regularly including soaking, removing the seed skin, etc. To beginners this can be an alarming issue! It is like learning how to bake a cake, when you start, you think there is only one perfect recipe and that you have to follow it to the tee, otherwise – flop! Same with Clivia seed, you are so worried that minor changes from one method to the next will result in losses and rightfully so at the prices you sometimes pay to get good stock seed. The secret is that you should find a method that suit your lifestyle and gives you good results. You also have to accept that you cannot always expect 100% germination, you are going to lose a few seeds sooner or later, especially if the numbers you germinate are large. It does not always mean that YOU did something wrong! As long as you provide a few basic requirements, you can do anything short of hatching your seed!

I have spent several days reading and researching all the e-groups, websites, old newsletters of clubs and the Clivia Society and I came up with some basic requirements with my personal comments thrown in between. I hope this will help those people who were confused about all this stuff like I have been and that I do not add to the confusion!

So let us put on our Clivia Caps! Why do Clivias flower when they do and why do the seed ripen when they do? In their natural habitat Clivia mostly occur in regions of Summer rainfall. They probably flower in spring/summer when there are many insects around to aid pollination (not in NZ!) and then they take 7 to 9 months (sometimes longer) to develop, nurture and mature their seed to be ready for favourable conditions in the next spring/summer period. By the time spring arrives the seed start to ripen and with any luck a bird or animal will eat the fruit, drop the seed, and when the warmer weather and rain of late spring, early summer comes, the seed is comfortable among the rotting autumn leaves on the forest floor and ready to germinate and feed off the rich leaf compost. If there is no help from the animal kingdom, the seed just germinates and grows in the berry. It will eventually become top heavy and end up on the forest floor. The moist environment on the forest floor probably keeps the seed hydrated, softens the seed membrane and I can imagine bacteria and warmth present from the decaying leaves may even assist in “dissolving” the membrane to encourage germination. And then man came along and ‘domesticated’ the Clivia. These amazing plants have realised after several generations in a domesticated environment, that man provides them with all they need and they start flowering at ‘unnatural’ times! But I digress....

Clivias are naturally slow growing, but man (and woman!) do not have the patience for this and they want them to grow faster, harvest seed early and germinate them quicker and better. And this is where the whole thing gets sticky....

About Clivia seed and germination:

The people that study these things say that Clivia seed is recalcitrant. To you and me this means they do not store well. As soon as the seed has matured, it will germinate and grow if conditions are suitable. If not, the seed will start to desiccate, the seed membrane will toughen and it will lose viability. It will eventually shrivel up and die. (In cold and wet conditions, like in most parts of NZ, the seeds will most likely succumb to rot.) It is however possible to store seed if absolutely necessary under the right conditions for a period of time, which I won't discuss now.

Basically the seed consists of an embryo and stored food reserves. (Very important to feed your Clivias when they have developing seeds, otherwise they will be hungry babies!) This reserve food will provide the embryo with energy to push through the micropore (it is like sticking your finger through a keyhole!) and develop into a plantlet with one root and 1 to 2 leaves. If the seed is old and desiccated, the skin over the micropore will be tough and dry, this will require much more energy for the embryo to break through and the emerging plantlet will be less vigorous, because its energy is too depleted to ensure a strong, vigorous seedling.

This is where all the soaking and skin peeling comes in handy. If seed is soaked and/or the skin over the micropore is removed, less energy is used and a stronger, more vigorous seedling is produced! And that is what it is all about!

The right environment for germination:

In order for the seed to germinate, it requires an external trigger from the environment. As previously noted by Prof. Gert Venter the following conditions encourages successful germination:

1. Optimum temperature of 23 to 25 deg C
2. Relatively high humidity (60 to 70%)
3. Sterile conditions

Be warned that if you are going to harvest and germinate your seed earlier and artificially, you must be able to sustain these conditions for the growing seedling. No use germinating them in your hotwater cupboard in perfect environment for 3 weeks and then planting and exposing them to cold and/or dry conditions.

Summary of the various methods to improve germination of Clivia seed:

1. Soaking:

- a. Fresh seed (harvested and cleaned)
 - i. Soak for a short time - 15 minutes to 2 hours in a suitable fungicide (few drops of Janola (bleach) in a cup of water will be good, many other recipes available) To be safe do not remove the skin over the micropore before this, as some chemicals can burn the tip of the radicle(emerging embryo).
 - ii. Blot seed dry on paper towel. Find the micropore on the seed, cut a halfmoon around it (use a scalpel or craft knife), not too close and lift the skin and peel off gently with a tweezer. The seeds can then be soaked in a solution of water with a few drops of Superthrive or Seaweed extract for 24 hours.
- b. Old seed (showing signs of desiccation)
 - i. As above, but for longer, up to 24 hours to hydrate the seed and soften the toughened skin over the micropore.
 - ii. Same as above.

Comments:

- For fresh seed this step is not necessary, just dust seed with a powder fungicide and go to step 2.
- If you have special seed, be careful with removing the skin, because if you do not work in absolute clean conditions, fungal infection is highly likely.
- Soaking and removing the skin are all ways to speed up germination. Using both or either will improve your results. If you only have a few seeds, you can do both, but if you have large amounts of seed, removing the skin can be tedious!
- Superthrive contains NAA, which is a growth hormone, and will further encourage growth. Seaweed extracts also contains natural growth hormones or stimulants which will do the same as Superthrive. Other chemical fertilizers will not have an affect. Check labels to see any mention of growth hormones or stimulants. Pure water will also suffice for soaking after skin removal.

2. Germination :

Once the seed is soaked, you can either place them between 2 layers of damp paper towel in a ziplock bag and put them in a warm spot such as the hot water cupboard. I use the gladware containers (I purchase these from the supermarket) with a layer of damp seedraising mix (Black magic or Butler's, obtainable from Mitre 10, supermarkets and garden centres – must be one that contains a fungicide). I place the seed on the mix and seal lid. They then go into the hot water cupboard for about 2 to 3 weeks. Again there is endless ways that people do this. Important that the container can seal to provide humidity and that paper or mix is not too wet. Also provide a constant temperature. If you germinate earlier or before weather conditions are warm enough, keep the seedlings in warm environment until they are bigger and stronger and move them outdoors as soon as weather is favourable. I have an old waterbed heater with thermostat under a closed lid propagator to maintain the temperature and humidity. That is after I planted them into 6 pack seedtrays using the same seed raising mix. As soon as the weather warms up I move them into my outside shadehouse.

Comments:

- I use the seed raising mix with a fungicide to avoid fungal infection during germination. I found it works well for me. Previously I had problems with infection and had to treat seed with chemical fungicides.
- I also found that the root sticks to the paper towel and makes it difficult to remove.
- The containers should be at least 4cm deep to allow for a decent layer of mix.
- I have found that the paper towel dries out and I constantly had to moisten it. I do not have this problem with the mix.

2006 CLIVIA CONFERENCE - PRETORIA, SOUTH AFRICA

It's unbelievable to think that in less than 18 months many dedicated Kiwi Clivia enthusiasts will be over in South Africa, home of the Clivia. There is still time for you to put your name forward and join the Conference and Tour. It will be an excellent opportunity to see Clivia in their natural habitat, meet new Clivia friends and educate yourself at the Conference. If you wish to join the Conference and/or Tour contact the Secretary ASAP for more details (nzclivia@clear.net.nz)

Part of the Clivia tour will take us down to Port Elizabeth. It's a beautiful area of South Africa on the south-east coast. Many of you will have seen the lovely green clivia that Charl Coetzee has bred down there. Chairman of the Eastern Province Clivia Club is Willie Le Roux. He's a lively and energetic person, with an awesome sense of humour. He enthusiastically writes to us about his favourite plant and city as an encouragement for us to visit in 2006.



Willie & Cynthia Le Roux – Willie is Chairman of the Port Elizabeth Clivia Club

A CLIVIA SHOW AND CITY WORTHWHILE VISITING DURING SEPTEMBER 2006.

The friendly city of Port Elizabeth, also known as Mandela Bay and which is home to the Eastern Province Clivia Club is situated on the South – East coast of South Africa which is being referred to as the Sun Shine Coast. It boasts with some of the best beaches in the Country. Especially Jeffreys Bay, the world known paradise for surfers.

In a radius of +- 100km we offer a dozen or more Game Reserves which includes the world known Shamwari, which has been voted "World's" leading Conservation Company and "World's leading safari and game reserve" (visit www.shamwari.com for more info), the Kragga Kamma Game Park (www.kraggakamma.com) only 15 minutes away from the City, the Addo Elephant Park which is known world wide (www.parks-sa.co.za) and the Sea View Game and Lion park on our door step (e-mail seaview@isat.co.za)

We also offer the well known Narrow Gauge Steam Train called "The Apple Express" (www.apple-express.com) with day trips, some of the best golf courses in the Country, a casino, nature trails, fantastic shopping malls, restaurants and respectable and reasonably priced Bed & Breakfasts, hotels, and many more. (For more info visit the Port Elizabeth Publicity Bureau web www.nmbt.co.za.)

Our Club started off as an Interest Group with an inauguration meeting in October 1999. On our request we attained Club status at the April 2002 Annual General Meeting of The Clivia Society in Cape Town. Since then, the Club has shown a very healthy growth from 80 to 225 at the end of 2004, the third largest Club in South Africa. This can only be attributed to a very active Committee coupled with regular workshops, discussion sessions on interesting topics and of course our outstanding shows supported by top quality plants and flowers. We are fortunate to have well known Clivia growers like Charl Malan, Welland Cowley as well as some up and coming growers in the likes of André Calitz, Charl Coetzee, Johan Mostert, Gideon Botha, etc. These gentlemen stock quality plants including most of the species found in South Africa and are great supporters of our shows and Clivia sales tables.

To celebrate our Club's achievement and to co-inside with the International Clivia Conference to be held in Pretoria during September 2006, we are planning a Clivia festival on the weekend of 30 September to 1 October 2006. To make it a bumper Clivia Show we hope to convince our neighbouring Clivia Interest Groups in George and East London to join us in this celebration. The show will be supported by lots and lots of stalls selling food and a variety of other products and possibly a live transmission by our local radio station. We will naturally do our utmost to have television coverage of the show again. We will also be offering some lucky prizes throughout the weekend.

To accommodate our visitors we will be looking at the possibility of creating a caravan village adjacent to the show hall and stalls. We will arrange with some of these stalls to serve breakfasts and even a braai (barbeque) in the late afternoon. Alternatively we will put feelers out to our members to accommodate our visitors or seek out respectable and reasonable priced bed and breakfast establishments.

Come and celebrate with – The Happy Clivia Family ! Hope to see you here.

Willie Le Roux
Chairman Eastern Province Clivia Club.

Letters to the Editor..



Dear Ed

Congratulations on a most professionally put-together newsletter, full of interest and great photos. I see mention of a BOP group - who is the convener please? - I would like to get involved.

Regards

Nick Miller - Rotorua

Robin Scoular is the Area Rep in BOP ph 07-5769082 – Wonderful people down there – Ed

Dear Ed

Thank you very much for your Newsletter, it is stunning to say the least. You are really doing excellent work, in promoting Clivia in your Country.

It is fantastic to see the healthy growth in your membership which naturally enlarges the Clivia family world wide.

Congratulations and keep up the good work.

Regards

Willie & Cynthia – Port Elizabeth SA

Dear Ed

This is really good stuff and a nice informal style!
Thanks.

There is one point I picked up on a quick first reading of NewZLetter - in Roger Fisher's article. re Chubb Peach: According to Sean Chubb one should put Chubb Peach pollen onto ones best Yellow, in order to improve the flower, and not the other way around, as Roger suggests.-

Cheers

John – South Africa

An Obsessive member is in our midst....

Recently, one of our loyal members needed a way of distinguishing his red seedlings from his yellows.

One day, the 'light went on' in the supermarket as he walked past the 'Maggi 2 Minute' noodles. Yes, you can guess the rest.. He bought up 200 pots of noodles and proceeded to eat them all in a couple of weeks. And Yes, he sure was ill after making his way through 200 pots.

But problem solved... he has all his yellow seedlings in bright yellow pots !!



His wife is sure there must be an easier way. (I did try and mumble to him that yellow labels were cheaply available...)

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Dear Ed

Many thanks for Newsletter. I'm glad they seem to get through to me OK. Always worth a read. I am doing some research on maximising colour differentiation on Striata at the moment so must try the Zebra fertiliser.

I thought the DoC were a bit ungracious in their apology. Clivia 'is not a weed - in NZ'. Implying that it is everywhere else. I see your Spellcheck allows you 'Clivatorium' (nice word that) and Cliviastuff (horrible!) but will not let you use English spelling of words like 'honour'.

The only point with which I would take issue is Rex Williams on Rust. Whereas he is very possibly right in his ultimate diagnosis, Rust certainly CAN start with distorted leaves. It did on the attached. First the distorted leaves and then the rust came.

You all sound to be thriving there. Mind you, with your scenery and climate you have no right to be otherwise.

All the best

Ian UK

The article containing 'Honor' was sent in by an overseas member. We decided it was ok, as Kiwis are accommodating & forgiving Ed



And from Roger Fisher... 'A short crawl through caulescens country'

I don't, as a rule, do weddings. But this – for reasons not to be stated here - was an exception. And in addition a colleague of mine - who is famous for perpetrating the legend that architects do far better baking pancakes - was hosting the event at his hotel in Graskop (which transliterates to Grassy Knoll). So we had three nights accommodation near the edge of the world – literally, with names like God's Window and World's View.

You take the newly upgraded N4 toll road out east which follows approximately the route of what was the NZASM railway line. If you follow it all the way you end up in Maputo in Mozambique. It also takes you past the industrial city of Witbank with its "dark, satanic mills" and eternal subterranean smoldering coal banks of fires which cannot be doused. Here signs alongside the highway warn you not to stop and have that uniquely South African road sign "Highjack Hot-spot". Informal settlements, the consequence of industries' demand for large labour pools and the lure of possible employment, are strung out alongside the verges near the towns.

But the road is state-of-the-art. And I am obliged to admire the first tollgate we encounter - designed by one of my ex-students, an innovative and eye-catching phantasmagoria, although I've no idea what the average traveler makes of it all.

Although not directly en route, we chose to stop off at Nelspruit, the declared capital of one of the new provinces of a now ten-year-old democratic South Africa's, namely Mpumalanga Province (literally 'The place where the sun rises'). This was because I wished, finally, to visit the Lowveld Botanic Gardens of which I had heard much, but never seen. It also provided opportunity to catch up with another of my graduates who had set up practice in this booming metropole.



Pink Caulescens



Butterflies on flooded causeway in reserve

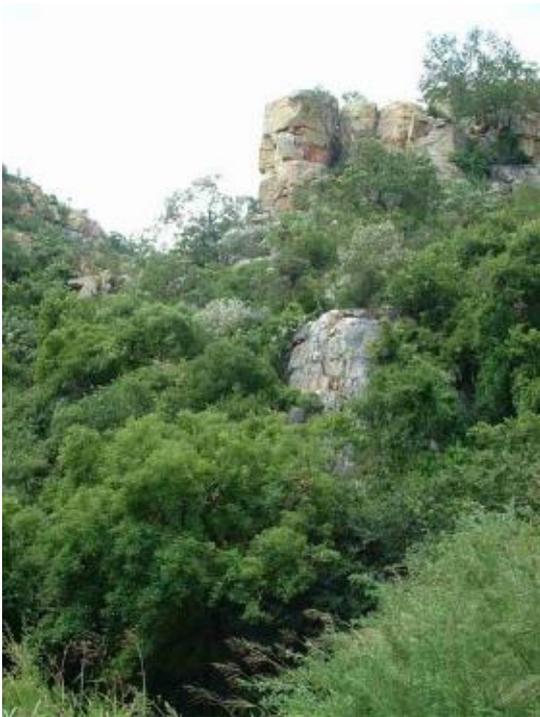
The botanical garden was quiet, with a courting local couple on the lawns. As you enter there is immediately ahead of the entrance a huge bed of clivias - obviously not in bloom because of the time of the year – but healthy large broad-leaved plants in profusion. We chose to explore the African tropical rain-forest display first, and this while the tower sprayer high above the treetops chattered away and created a cool relief on a hot day with temperatures way into the thirties. A fair investment has been made in the infrastructure of the gardens and we crossed a newly-built steel suspension pedestrian bridge across the Nel River – a rocky gorge where the river finds its origin - and proceeded to the restaurant – also newly constructed in what a colleague calls Afro-bongo-bongo style but probably better described as Bundu - that is thatch and pole with timber doors and windows. A group of elegant 'mature' women were having their annual Xmas party in dignified style. We tried to guess the association. We should have asked, I suppose. My ex-student - now colleague - joined us. He is busy with his own cliffhanger home with a lawned roof garden just big enough for the miniature Schnauzer. He intends covering the cliff-face with clivias. He says the September show held there by the Lowveld interest group was spectacular and inspirational. After lunch we returned to our walk through the gardens, continuing through the rain forest where the caulescens were planted, and then round one of the loops. All about was the industry of manicuring. What is commendable is that each area has the name of the gardener that tends it. At the entrance is a small nursery, due to be moved to adjacent the restaurant across the ravine. There were a fair number of young clivia plants, two and three years old, and some nobilis seedlings. I missed the opportunity to buy some since I did not want to lug them around.

On the way out I wanted to stop off at Klugro Nursery, since it is supposed to specialise in clivias but I got no answer to my telephone call and although it is rumoured to be on the Lydenburg road by which we left the town, I did not spot it. Next time.

The drive is through scenic country as you rise up the scarp. The area is covered by the largest man-made forests in the world, which has its pros and cons. The biggest con is that these have replaced the indigenous forests - other than those of the protected reserves - in all but the most inaccessible valleys. This means that the many plants, including clivias, that once co-habited there are also no more.

We stopped at the little town of Sabie, located at the crest, the forestry industry its reason for being. I was actually looking for a bank. I however went off to photograph the little Baker Anglican Church, St Peter's. Beneath the Jacaranda was a good stand of broadish-leafed clivias with large heads of ripened fruit, of which I collected some after negotiating with the resident gardener. The garden is immaculately kept. I suspect some are caulescens but could not immediately distinguish them apart. I'll have to wait to see what the plants do, although when I cleaned off the pulp many of them had already sprouted, a sure sign of over-ripeness. They're shooting eagerly and seem to be healthy, sturdy, vigorous plantlings.

We drove past the Mac-Mac falls – reputedly named after all the Scotsmen who migrated to the area, baited by the gold diggings of Pilgrims' Rest – we giving the habitat caulescens I know grow there a miss. We arrived at Graskop feeling that the day had been well spent.



Caulescens country near Stridjdom Tunnel



Falls & Forest in the Reserve near the Downs

That night it poured with rain. The next morning brought the mists that rise up from the Lowveld and give the place the ideal microclimate for gardening. I strolled around the little town in the early morning examining the gardens. Surprisingly, very few grow clivias although it seems the ideal environment. But I did spot the odd caulescens, one acting as a pavement plant. These have probably been lifted from nearby naturally growing habitat specimens and moved into the garden. God's Window is just down the road and one of the renowned stands of habitat caulescens.

But on with the travels.

I had attempted to contact Marguerite McNeil of the Downs and had only managed to connect with an uncomprehending domestic helper. You descend through a spectacular pass and marvel at the ruggedness of the scenery once you leave the rain belt. Along the route is one of the oddities of Nature, a waterfall that grows forward out of the rock face as the active algae precipitate the high calcium concentrates from the water.

The Downs are located in a Reserve along a dirt road off the main connector between Graskop and Tzaneen on the Lowveld. The heavy rains had passed through and the roads were treacley. Repair work to wash-aways were already underway. I wondered about the passibility of the roads in the park. At the gate we enquired as to whether Miss McNeil was there. The gatekeeper said not - a disappointment, but not unexpected. We were not only there for the clivias but also for the scenery, which has its own appeal. Oddly there is an unexpected tarred stretch of road to take you up the pass, in impeccable



The Downs



Gal-Selati-River-In-Reserve

condition. We met a family of three walking up the road, loaded with carrier bags, suitcase on the head - which is characteristic of how the locals cope. We offered them a lift although we had no idea where to. The tar road ended and turned into a dirt road, which in turn became a rutted uneven double track. We decided that an ordinary sedan would not make it much further and off-loaded our companions and watched them trundle on, to an unseen destination. The surrounds were old sub-tropical fruit plantations – probably mango and litchi – which had been expropriated and incorporated into the Reserve. Ruined structures and neglected fruit trees were all that remained. I wondered precisely where the McNeils are located but saw no signs of habitation. I understand you need a four-wheel drive to get there.

We went to look at the accommodation the Park has to offer. On a previous visit some eight years ago it had been decommissioned. Now everything was back in order and the timber cabins tucked amongst the trees with bedding, kitchen utensils and all, spick-and-span. The setting is enchanting with a free-flowing clear stream nearby which some previous enterprise had dammed into swimmable pools. If I were a NZ group planning to visit in 2006 I'd find an overland touring vehicle and book in here for a night, having visited at Marguerite McNeil.

We traveled back through the southern end of Limpopo Province, passing a never-ending line of game fencing of the private reserves that abut the Kruger National Park. How you choose a destination between all these, I've no idea. Then you enter the environs of Bushbuck Ridge, a contentious tract of land where there has been political to-ing and fro-ing as to which province it should be allocated. Back to Graskop up another pass – Kowyns - and we were home. Supper were pizzas in the local –eria, which were eaten as the mists swirled through the door.

Dawn three was our last for day tripping. Graskop is located within easy reach of various drives so we had opportunity to explore yet another, this time down to Hazyview and then along a scenic drive to White River. A sign 'Plants' and then another 'Open' attracted attention. A foreign voice emerging from a door labeled 'Lodge' directed us to the side of the property where we found a dreary looking little place with straggly, weed-riddled plants. Nothing daunted, I inspected the sad apologies for clivias and found them to be caulescens, one decaying plastic bag having two offsets alongside the plant. At twenty Rands it was a steal - probably already stolen, for when I got home and decanted the contents I discovered a stem all the way down to the bottom of the packet with roots along its full extent. Where it stuck above the soil the 'bark' had rotted, so it was in fact a new plant perched above an old stem. I've exposed the bleached portion which is now greening and put a composted net bag around the wound and the new roots are sprouting. And I have two additional plants plus a seed head. Since we were in easy reach of Nelspruit I had second thoughts about the plantlings I'd forsaken, so determined to return. Along route - as we exited White River - we passed an establishment called 'Big One Nursery', so we ventured in. There be clivias. Nothing spectacular, but amongst the 'craziata' [thank you Di for broadening my vocabulary] some broader-leafed which have different characteristics to those I have in my collection – apple green, slightly uneven margins and a fleshy, unveined form. Amongst these I found a clumper – not just an off-setter – which is the first I've found in the broader-leafed form, and having read in the latest Society newsletter that the Australians have taken to putting these in hanging baskets, I decided to take it. Although I'm sure it's not really a hanging basket subject!

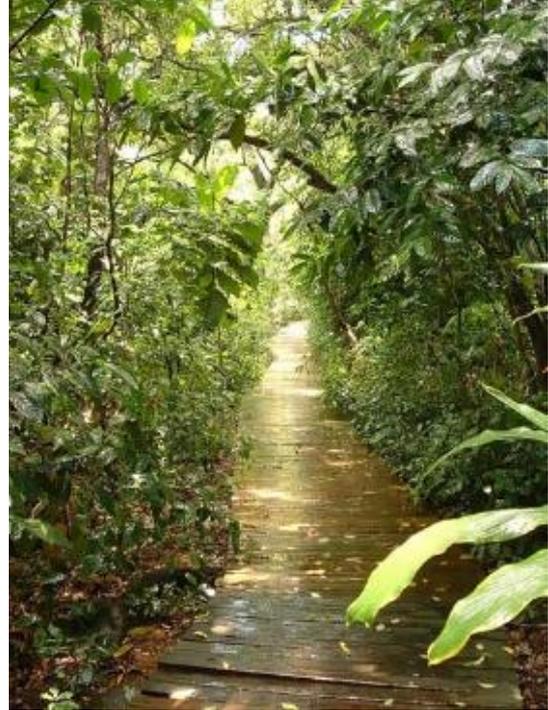
So back to the *Horta Botanica* to claim some two-year-olds at R10 a piece – which I consider fair deal since I'd paid R30 at a local indigenous nursery for the self-same generation from the very same source! I claimed, on payment, some twenty-two plants, having sought out what I considered to be darker green and rounder leaf-tipped varieties – although I've been told that the true leaf form only reveals itself after the sixth leaf.

Satisfied, we returned to the celebrations.

I shan't bore you with the details, except to say it was a rather pantheistic affair conducted by a retired professor of Calvinist theology in the open air under threatening heavens close to a precipitous edge. The next day we went homeward, via yet another route past Pilgrims rest. The obscure and not often encountered *Littonia modesta*, relative of the flame lilies, were in bloom, the first time I've seen them in such profusion. They would make for a magnificent garden addition if conditions were suitable. It is amazing how under-exploited South African floral riches are.



Above
Nelspruit NBI Clivia Bed



Right
Nelspruit NBI Rain Forest Boardwalk

On the route round to Lydenburg we passed Mount Sheba – and, let me admit it, I have an elicit (not of my own doing, let me hastily add) habitat plant from the area – and through Spekboomrivier (Bacon Tree River, after a particular *Euphorbia* endemic to the area). Just past the cutting there was a sign off to the left 'Plantsman Nursery'. I just needed a peep. It did not look promising until we arrived, and then noticed it was a rather extensive and well established enterprise. But no clivias on the sale floor although I noticed them tucked away under nets which said 'No entry' or 'Strictly Private'. A fellow peruser noticed my perplexity and asked if he could be of assistance. Regrettably, I forgot to ask his name. He has relocated from Johannesburg to nearby Dullstroom which has now become yuppie trout fishing territory and was busy transforming an old property into an indigenous landscape which he planned to open to the public. He also told me of a farmer who ran one of the best indigenous nurseries somewhere up in the kloofs, but unfortunately there was no time for that. He introduced me to the nursery owner, a brusque and weather-beaten type who said he had no clivias for sale. When I pushed the matter he said his crop had been devastated by lily borers and black locusts – the first time I'd heard of the latter adding to clivia-growers woes. Strangely enough, no sooner had I heard the story than it was repeated by a local grower of indigenous plants just the other day.

And so we returned home, with me having more plants to decant and repot.
And more stories to tell.

Roger Fisher
Pretoria – South Africa



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A Clivia all tied up ???

Rosee writes My Daruma seedling was growing all over the place and I had seen photos of Chinese growers with either pegs on the leaves or in a frame. I tried the pegs (even with tissue paper) and they left an indentation. I decided to try garden twine (same as Grandma used to knit into bath mats) and hey presto ! it worked. No indentations, no marks and 'straight as soldiers' leaves. Now a lovely form worth treasuring.

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Thought you'd like to see what you're missing in NZ....

Insects that create REAL Clivia 'crappiatas'. I have developed a morbid fascination. I caught the moth fluttering under the netting and put it in a jar. She produced more clusters of eggs in there. I needed to keep an eye out to find where she'd deposited the others. I work out at about fifty eggs per deposit that's about two hundred worms per moth! Only noticed once the damage was done. taped the bits onto the window to watch how they went about their work.

Roger Fisher
Pretoria South Africa

Right : *Brithys pancratii* hatchlings
Below : *Brithys pancratii* moth laying eggs
Photos by R. Fisher



BOOKS FOR SALE

✚	'Growing Clivias' by Graham Duncan – very popular and selling fast	20.00
✚	Clivia Society Year Books – a must for every clivia enthusiasts Year Books 1 – 4	15.00
	Year Books 5 & 6	20.00
✚	Year Book 7 – If you are not a member of the Clivia Society – order your copy now !	Price to Come
✚	'Hints on Growing' for all new clivia enthusiasts	8.00
✚	'Clivias' by Harold Koopowitz – the Bible of clivias	80.00
✚	'Appreciation of Clivia' with English translation	80.00
✚	'Changchun Clivias' beautiful photos from China	65.00
✚	Notecards – 4 Clivia cards and envelopes Perfect for birthday and greeting cards	5.00
✚	Eppendorf pollen tubes – pkts of 10. With cap for easy storage.	2.00
✚	Colour Charts – check the colours on your blooms this coming season	15.00

Post your cheque made payable to 'NZ Clivia Club' (please include 90cents for small books and \$3.50 postage for larger books) and post your order to The Secretary, NZCC, 71 Taylor Road, Mangere Bridge, Auckland

OFFSETS FROM THE MAIL BAG



Ian Coates writes..

Ready for 2005? I hope you have a smooth ride. Recently, I was diagnosed with A. A. A. D. D. (Age Activated Attention Deficit Disorder). This is how it works. Today, I decided to wash my car. As I start toward the garage, I notice that there is mail on the hall table. I decide to go through the mail before I wash the car. I lay my car keys down on the table, put the junk mail in the waste paper basket under the table and notice that it is full. So I decide to put the bills back on the table and take out the rubbish first. But then I think, since I'm going to be near the postbox when I take out the rubbish anyway, I may as well pay the bills first. I take my chequebook off the table and see that there is only one cheque left in it.

My extra cheques are in my desk in the study, so I go to my desk where I find the can of Coke that I had been drinking. I'm going to look for my cheques, but first I need to push the Coke aside so that I don't accidentally knock it over. I see that the Coke is getting warm so I decide I should put it in the refrigerator to keep it cold.

As I head towards the kitchen with the coke, a pot of Clivia on the counter catches my eye – it needs to be watered. I set the Coke down on the counter and I discover my reading glasses that I've been searching for all morning. I decide I had better put them back on my desk, but first I'm going to water the Clivia. I set the glasses back down on the counter, fill a container with water and suddenly I spot the TV remote. Someone left it on the kitchen table. I realize that tonight when we go to watch TV, I will be looking for the remote but I won't remember that it's on the kitchen table. So I decide to put it back in the lounge where it belongs, but first I need to go to the bathroom and then I'll water the Clivia. I get to the bathroom but can't remember why so I go and splash some water on the Clivia. Most of it spills onto the floor. So, I set the remote back down on the table, get some towels and wipe up the spill. Then I head down the hall trying to remember what I was planning to do.

At the end of the day: the car isn't washed, the bills aren't paid, there is a warm can of Coke sitting on the counter, the Clivia isn't watered, there is still only one cheque in my chequebook, I can't find the remote, I can't find my glasses and I don't remember what I did with the car keys (but I did find out why I wanted to go to the bathroom!) Then, when I try to figure out why nothing got done today, I'm really baffled because I know I was busy all day long and I'm really tired.

All the best.

Ian

ps I can't remember if I told you this already!

Ian has been a long time friend of our Club! Hes promised to come over in 2008 and do a 'one man Comedy Show' ! (if he remembers) - ED



From Rex Williams – healthy clivias in a sub-tropical garden



From Murray Gow : Above :A Hammett 'nobilis x walters yellow'
Below : Hatch bi-colour



MITE & MEALY BUG INFESTATIONS - Updated...

Many of you have had an infestation of mites and mealy bugs. This has created frantic pounding on the keyboard to the Editorial Team's desk with a resounding SOS ... HELP! The emails have also been flying to the NZ Clivia yahoo site.

To recap... Last year many of you noticed the sides of leaves starting to wilt and deform inwards, with no visible signs of anything untoward such as mealy bugs, virus damage etc. Here is an update from emails and letters received from members..



Photo of a Mite infested clivia

"Yes I too have discovered mealy bugs "hiding under the rim" at the nursery I work at. Like your Ozzy pal I have used Rogor 2 treat the buggers when I was growing Orchids with excellent kill rates, often resorting to plunging plants pot n all into a bucket of spray as they often lurked in the very open bark mixes I was using at the time. Be warned, Rogor stinks worse than Orthene & may not be available to home gardeners in NZ? The biggest problem with spraying mealybug is actually getting the spray through their hairy little hides which are water repellent so a wetter/sticker is essential if using wettable powders. If u are dealing with a small infestation the best remedy is meths & a small paintbrush. As for mite sprays, Most are just contact sprays & few if any kill eggs so one is stuck with repetitive spraying "

Symptoms

A fine pale mottling develops on the upper leaf surface. In heavy infestations fine silk webbing can be seen on the plants, the leaves lose most of their green colour and dry up or fall off. Heavily infested plants are severely weakened and may die.

A very wide range of plants in glasshouses and homes can be attacked, and red spider will also cause problems in gardens in late summer, especially in hot dry summers. Large numbers of mites, up to 1mm long, and spherical eggs can be seen on the lower leaf surface (easier to see with a x10 hand lens).

Cause

Despite their name, during the spring and summer these sap-sucking mites are yellowish green with a pair of darker markings, only developing an orange red colour during the autumn-winter resting period. Because of this they are sometimes called the glasshouse two-spotted mite.

Control

Glasshouse red spider mite can be difficult to control as it breeds rapidly in warm conditions and some strains of the mite have developed resistance to some insecticides. Biological control is an attractive alternative to using insecticides as it avoid resistance problems and the risk of spray damage to the plants.

sprays containing vegetable oils or fatty acids (see above). The latter pesticides may require more frequent applications.

STORING YOUR POLLEN THE EASY WAY

Storing your pollen is now a hundred times easier. The Club have purchased a supply of Eppendorf 1.5ml tubes (with caps). Brush your pollen into the tube, fit the cap tightly, label the tube (plenty of room to write your code) and put away in the freezer till you need it.

1 pkt of tubes (10 per pkt) for only \$2 Order from the Secretary.



ARE YOUR CLIVIAS GETTING SUNBURNT ?

Shady Ideas



Running short of shaded spots in the garden to plant out your recent acquisitions?

I'm planting groups of the tree fern *Cyathea medullaris*, mamaku, or black ponga*, as these grow relatively quickly into large ferny umbrellas, and by the time my seedling clivia are ready to plant out into the garden, will be providing sufficient shade.

Plantings of *Rhopalostylis sapida*, nikau will also be included as soon as the pongas have made enough shade. It is my observation that the way in which the nikau leaves catch the rain they will provide some added protection at flowering time. This is, of course, a slightly longer term project than the ponga solution, but then the clivias themselves are a big feature in the patience department too. I think it will be an added feature to the garden, pongas and nikaus underplanted with clivia, and it might even keep DOC happy too! In an established part of the garden, where I have some of my best clivias safely tucked away, I have had a gap open up in the canopy due to pururi moth caterpillars destroying a tree. At this time of year there is far too much strong sunlight coming in, so I have rigged up a shade sail made from a few metres of windbreak cloth in between the remaining trees until a replacement tree grows. If you try this, put it up fairly high or on an odd angle so that smaller and more nimble visitors to the garden are not tempted to try it out as a hammock. Also slip the attaching ropes through short sections of hose pipe to protect the bark of the supporting trees.

*I've always called them punga, but apparently that's not correct.

-Helen Sanders

Thanks Helen.. Part 2 on Shady Ideas will be in the next NL - Ed

And Finally....

This has been an incredibly long NewZLetter. Hope you're still there? Thanks to everyone who has contributed.

To contact us email the Secretary :

Di Smith nzclivia@clear.net.nz

Subscriptions : \$15.00 per annum
(January to December)

Post your cheque to :
The Secretary
71 Taylor Road, Mangere Bridge
Auckland New Zealand

Website : www.nzclivia.org.nz

If you have any seeds/plants you wish to donate to the Club for fund-raising purposes, please contact the Secretary

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