

MEMBERSHIP

Membership of the Study Group continues to increase and I am pleased to welcome the following:-

ACTIVE.

Mr. Dewi Price, 3 Hillcrest, Langland, Swansea, West Glam.,  
SA3 4PW, Wales.

Michael H. Mattner, 70 Kerr St., Warrnambool, Vict. 3280.

Nick. F. Derera, 5 Lister St., Winston Hills, N.S.W. 2153.

Tim. P. Angus, 35 George St., Springwood, N.S.W. 2777.

A.J. Newport & Son, P.O. Box 2, Winmalee, N.S.W. 2777.

Martin Swanson, Wildtech Nursery, Licola Rd., Glenmaggie, 3858.

Dr. Geraldine McGuire, School of Biological & Environmental  
Sciences, Murdoch University, Murdoch, W.A. 6150.

PASSIVE.

S.G.A.P. Queensland Region Inc.

Dewi Price has expressed great interest in the subject of seed propagation of Verticordias. We will certainly be looking forward to hearing of his progress in far away Wales.

Nick. Derera is working in association with Tim Angus and nurserymen A.J. Newport & Son in a Government assisted project with the ultimate aim of exploiting the export potential of Verticordias. Nick., who has directed a section of Agricultural research with Sydney University, intends to give specific attention to the overcoming of fungal problems which appear in cultivation. They have tissue culture facilities available which they propose to use with Verticordias where appropriate.

Dr. Geraldine McGuire has just commenced working at Murdoch University on the plant breeding and genetics of Verticordias and has particular interest in aspects of hybridisation.

Martin Swanson has particular interest in seed propagation of Verticordias and has sent me a detailed report on his methods which I have included later in this Newsletter. His nursery is situated in the foothills of the Great Dividing Range in Eastern Victoria. Rainfall of 600 mm per year average occurs mainly between Autumn and Spring. Summer is very hot and dry. He runs a Native propagation nursery supplying tubestock to specialist native nurseries and cut flower growers. He is a firm believer that selection of "reliable" forms demands selection of forms in Eastern Australia rather than the West, hence his particular interest in propagation from seed. As with the above members noted Martin has access to tissue culture for difficult species.

I was particularly interested in his comments to me re Verticordia mitchelliana. He finds the species one of the easiest to

maintain both in containers in his nursery and in sandy ground conditions. I wish I could say the same for growing performance in Sydney.

It is very pleasing to note the degree of participation in our Study Group by professional nurserymen and others with specific research interests such as Geraldine McGuire. With such co-operation and the enthusiasm of our "lay" members we should be able to give the subject a real nudge.

#### SUBSCRIPTIONS.

Will members please note that subscriptions for the 1988/89 year are now due and early attention to the matter would be very much appreciated. Rates are unchanged, being \$ 3.00 for both ACTIVE and PASSIVE membership and \$ 10.00 for those overseas.

#### DONATIONS.

We are very grateful to the following who, in subscribing in excess of the nominal fee, are continuing to make it so much easier for the Study Group to advance our aims.

Dave Gordon -----	\$ 7.00
Rodger Elliot -----	7.00
Val McConchie -----	2.00
Col. Thorley -----	27.00
David Andrews -----	2.00
S.G.A.P. Canberra Region -----	2.00
S.G.A.P. Queensland Region -----	2.00

David Andrews, in addition, has manufactured and donated steel shelving for a small glass house I have erected for the purposes of propagation of some of the more difficult species and research into grafting of those Verticordias which have been identified as subject to below ground difficulties of establishment.

I am also pleased to report that the N.S.W. Region has agreed to assist the above program by making available plant misting and bottom heating equipment.

#### RAISING VERTICORDIAS FROM SEED.

From a report by Martin Swanson who says "the description of seed raising techniques for Verticordias is based on my own observations and experience and I don't claim total knowledge on the subject".

" Verticordias set their seed after pollination in a single ovary at the base of the style. When we purchase seed usually only a very small percentage is viable. As a rough guide I have learnt to assess the merit of the seed by rolling the capsule between the thumb and forefinger. Fertilised capsules usually feel firm, whilst those which are useless crush easily. I am not sure whether the embryo reaches maturity while the capsule is still on the plant, or matures in response to the decomposition of the flower capsule buried in the soil. You can break open the larger capsules (e.g. grandis, ovalifolia etc.) with your thumbnails and remove the embryo.

Germination of seed commences when moisture penetrates the coat. In the case of Verticordias however, there is a problem. The capsule is quite woody and if the embryo began to shoot prematurely

RAISING VERTICORDIAS FROM SEED (CONTINUED).

it would not be able to escape the capsule walls. In nature, the capsules slowly decompose in sandy soils, often where sand has been blown up against a fallen branch or log. Some trials conducted in W.A. have found that seed sown in Autumn begins to germinate the following Autumn. Many W.A. plants seem to wait until Autumn to germinate, presumably so that the seedlings have favourable conditions to get their roots down deep before summer. It is assumed that progressively falling ground temperature or increasing cold at night act as the trigger.

Successful germination requires that the capsules be kept moist enough to slowly decompose without rotting the embryo or continually inducing moulds on the capsules. Also the seed must be warm enough to grow. Below 15 degrees C. there is little plant growth and above 25 degrees C. moulds and fungal outbreaks become a real problem on moist seeds.

The simplest and easiest way to raise Verticordias from seed was used by the late Bill Cane, one of the founders of S.G.A.P.. He raised most of his difficult to germinate plants by simply broadcasting the seed onto a raised sand bed in his garden and letting nature take it's course. If it took several years for something to germinate there was no input of labour or skill required. The difficulty with his process would arrive when trying to identify the various seedlings of many genera when they emerged, and the control of weeds, birds and cats.

To raise Verticordias from seed under controlled conditions we must provide a microclimate which mirrors their native habitat but accelerates the germination process. The propagation mix must be extremely well drained.

Beware... Perfectly drained garden soil becomes poorly drained when placed in a pot or seedling tray. Furthermore soil becomes a home for soil "bugs" and should "never" comprise the bulk of a mix for raising seedlings.

The mix should also be sterilised with steam at 70 degrees C. for  $\frac{1}{2}$  hour to kill soil pathogens or 100 degrees C. to kill weed seeds as well. Do not incorporate fertiliser prior to steaming.

A suitable mix is :-

75% 4mm filter sand (sharp with no fine particles)  
20% Peatmoss.  
5% soil.

I do not advocate the use of chemicals like Fongarid to control Pythium and Phytophthera when germinating Verticordias for two reasons.

1. Fongarid, Alliette and other chemicals are reported to work via a phosphorus pathway in the plant tissue and can be toxic to some species of plants. One grower told me that a nursery crop of Thryptomene (same family as Vert.) had stopped growing after being sprayed with Aliette. It would be dismal to raise a crop of seedlings only to lose them after spraying.
2. Our long term goal in raising Verticordias from seed is to find the genetic "freaks" from each species which are able to grow under conditions more wet and humid and disease prone than they experience in the wild. It may be

RAISING VERTICORDIAS FROM SEED (CONTINUED).

one a hundred or even a thousand plants which is tough enough to survive the conditions it will face at the hands of the general gardening public. Any seedlings prone to soil borne diseases caused by damp soils should be allowed to die. It is better to lose seedlings than established plants, or worse still introduce pathogens into our nurseries and gardens because Verticordias may have been kept alive by the regular use of Fongarid.

We sow our Verticordia seed in 300mm x 300mm x 50mm deep plastic nursery trays. These are almost filled with the propagation mix I described. The capsules are sown across the surface in a single layer, and then filter sand is scattered across the top of the capsules so that some are buried and some half buried.

These trays are then placed in a glasshouse on a capillary bed, (bog method), with the water level set so that the surface of tray never appears more than slightly moist. If you set the water level too high the capsules will rot. The trays are bottom heated at 20-25 degrees C. and hosed occasionally to simulate rain and to compensate for drying out during unusually warm days. There is some evidence that the continual oscillation from almost dry to damp and quickly back to almost dry speeds up the process of germination. After being placed in the propagation house the trays are sprayed with a general fungicide like Benlate every 10 days to prevent the growth of mould and fungus on the Capsules.

When (and if), germination occurs the seedlings are left to grow until the first true leaves appear. If the weather is cool they are pricked out of the seedling tray direct into a tube which is then sprayed with Benlate and placed under intermittent mist for one week and then into a drier glasshouse for a period of growth. Liquid feeds such as Nitrosol are safe and kind to Verticordias, but don't use them on very hot days or the leaves will burn.

If the Verticordias germinate during the hot part of the year the process is similar except that the trays are moved from the capillary beds and placed in a drier environment to harden the seedlings up, prior to pricking out.

As a general rule, Verticordias do not appreciate this pricking out stage. I am sure that those plants which perish during pricking out are not as genetically "tough" as the survivors. It's the survivors which may yield the hardy plants we need to bring Verticordias into wider cultivation.

The deeper the tube you prick them into the better the drainage will be.

For members of the study Group who don't have glasshouses a way to eliminate the pricking out problems would be to sow the capsules in deep tubes or even 15cm pots and "weed out" all but the best looking plant in each pot. The pot could then be top-dressed with slow release fertiliser and a source of iron, and grown on to planting out or potting on size."

### RAISING VERTICORDIAS FROM SEED (CONTINUED)?

In the last Newsletter I referred to a small batch of Verticordia insignis I had germinated and potted on in November after allowing them approximately four months to harden up. I am pleased to report that most of them have survived, although growth has not been vigorous. To say the least, this result has tended to restore my faith a little in the seedling propagation process. I note Martin Swanson's reference to Nitrosol as a foliar fertiliser and will try same to see if I can speed them up a bit.

The seedling boxes were covered with glass during the summer and re-exposed to the weather from 1.3.88. To date only one seedling has emerged, another Vert. insignis.

### VERTICORDIAS AND THE BIG WET.

This time last year I referred to the very "kind" weather pattern in Sydney, 1987, from January till August.

This bi-centennial year however they have "thrown the book" at us. By early June our annual rainfall of 47 inches was exceeded. The weather was not consistently wet however, but was characterised by periods of very heavy flooding interspersed between weeks with fine weather, at times below average in temperature and with very low humidity. With many General as well as Native Plant nurserymen claiming this to be the worst January to June period they could remember you could say that our Verticordias in Sydney have been well and truly tested. I am not about to say that they all came through with flying colours, but some at least have done quite well. Since the rain gave up in June we have experienced two months of continuous sunshine with very dry air and warm winter temperatures, reaching 25 - 27 degrees for three consecutive days last week.

Before some of you interstate Study Group Members say "so what", remember that Verticordias, according to earlier reports from their home state tend to react a little unfavorably to dry winters.

To take an optimistic view, and all members of our Study Group should be optimists, you could say it was like the case of the girl who was horrified when accosted with the wolf at the door but finished up with a fur coat. I think we could say that we have been presented with an excellent opportunity to advance our understanding of climatic tolerance.

In my own garden, root rotting, ostensibly from Phytophthora attack is starting to show out as more of a hazard than earlier results indicated, although in most cases losses have been random rather than consistent through a particular species. I feel that, in my heavy loam section of the garden, where early growth rates of a number of species suggested acceptance of the soil type, some problems may be starting to show out due to compaction with time.

Col. Thorley, with a soil type of similar structure, has made the same observation, his species losses being, in a number of cases similar to my own, and again random rather than consistent.

VERTICORDIAS AND THE BIG WET (CONTINUED).

Strangely enough, of the species I have planted, with my fingers crossed, in a section of garden where I have needed to contend with sticky clay, I have had very little trouble. Growth rates however have been a little inferior to plants in the heavy loam.

I have noted that in cases where partial die back from root rotting did occur, (with the erect form of Verticordia huegelii), and temptation to remove affected stems was resisted until all flexibility and traces of stem sap was lost, the end result has been recovery of the specimen.

I have adopted this same procedure with other plant genera in the garden with similar result.

In discussing this subject with Dennis Margan he made an observation that soil texture, he felt, played a significant part in this plant recovery phenomenon, and that in light well drained soils, Phytophthora attack is more likely to proceed to complete loss.

An explanation may be that in clay, providing some mulching is used, the level of soil moisture is much more uniform throughout dry and wet weather cycles. This could conceivably have the effect of restricting excess movement of ground water in wet periods, thereby reducing transport of the fungal spores through the soil.

Dennis Margan reported losing Verticordia oxylepis in the big wet. His plant, in light soil as noted, had achieved growth rate exceeding that of any of my specimens in the heavy clay loam. None of my plants however have reacted unfavourably to this years run of weather.

Verticordia plumosa has frequently been considered one of the easier species to maintain, but strangely enough, it has, this year been one of my more fickle species. In both heavy loam, which I will refer to as "H", and a light soil bed of coke ash hardwood sawdust, pine bark (both composted), coarse sand and 15% alluvial loam, which I will refer to as "L". This latter bed has had 9 months of smocote added at time of planting. Losses amounted to 3L and 4H but other specimens in both soil categories have remained healthy. Phytophthora has been the major hazard but two of the L specimens were in a north facing mounded situation and root examination suggested drying out. I have noted that the roots of this species have generally developed laterally at from 75 to 100mm below surface and tend to follow capillary moisture zones such as south slopes of mounding and below the foliage of adjacent dwarf shrubbery. Perhaps it would be appropriate to say that this species will adapt to a range of soil types providing that drainage is good and some capillary moisture is available.

Verticordia mitchelliana is a species I have yet to maintain for a reasonable time and this year was no exception. The danger period is always late summer/early Autumn and follows a 3 to 4 months period of intense growth. I note with envy a comment in Malcolm Swansons report that this is his most reliable Verticordia. As in Sydney, he says it is in its most

VERTICORDIAS AND THE BIG WET (CONTINUED).

active growth phase from January till March, when it suffers a small amount of damage from mould or fungus as humidity increases. This is restricted to a few leaves on the growing tips and is quickly and easily controlled with Benlate. My most recent loss was in the "L"bed. Examination of the root system revealed lack of deep penetration, with knuckling at the level of the bottom of the nursery pot. There was also evidence of Phytophthora attack. In early March I noted leaf deterioration in the central region of the foliage. I was unable to control this with fungicide and leaf fall ensued progressing finally to total loss.

As I see it, the question is:- Was the leaf fall a consequence of fungal attack below ground or did same develop when the leaf/root ratio of the plant was thrown out of balance by leaf drop ? I am inclined to the latter view. Perhaps Malcolm Swansons deep sand with drier summer air is something which this species finds it difficult to do without.

Accordingly I have decided to give it a high priority on my grafting program.

Verticordia chrysantha variety preissii has weathered the conditions very well with 3 H and 3 in the clay surviving. The only loss was an "H" specimen situated near the bottom of a sloping edge, which had been considerably over-run by a ground cover plant. I have noted that this species does not relish foliage competition. In addition the dense ground cover would have resulted in a concentration of soil moisture around the Verticordia roots during the heavy rain.

Of two plants of Verticordia muelleriana L, (I have not been able to establish it in the heavy loam), one succumbed to collar rot after the 19 inch downpour in April. The survivor is currently making a little new growth after some winter leaf drop. From my observation of this species in the wild however, I believe some leaf fall in the post flowering period is the norm. My early new growth probably reflects our rather warm winter.

Two specimens of Verticordia ovalifolia L both grew well and flowered early summer but were lost from collar rot after the April rain. On the other hand a less vigorous specimen H has survived and is currently in flower.

One plant of Verticordia brownii L has deteriorated recently and will probably die. This is the pink form from near Cape Arid. Another specimen remains healthy as is also a white form in the same bed. I have not been able to establish this species in the heavy loam.

One plant of Verticordia densiflora H appears to be dead, but 4 others H have survived and one in the clay section.

Verticordia nobilis H (planted Dec. 85) was lost to Phytophthora after the April rain. A younger plant H is currently in flower.

VERTICORDIAS AND THE BIG WET (CONTINUED).

Two Verticordia multiflora H and one L all died from Phytophthora. In all cases I suspect the trouble started after leaf deterioration from humid weather. I threw the plants out of balance, and surmised with Verticordia mitchelliana above at a time when excessive ground water existed. Fortunately 2 younger plants H have been unaffected and are currently making good growth.

Verticordia oculata appears to have died in the heavy loam bed but I have not lifted it yet to examine the roots as I have noted that in its natural state it frequently suffers some leaf drop in winter.

Two plants of Verticordia picta L were lost, one from collar rot and the other from Phytophthora. Both flowered well last spring. I have not been able to establish this species in the heavy soil.

Verticordia serrata H (broad leaf form) grew on a little after flowering but died in May after the foliage appeared to have been affected by humid weather. I could not detect any evidence of collar rot or root rot. The roots had penetrated deeply. A specimen of the fine leaved form has survived in the heavy soil.

Col. Thorley reported losing his plant of the fine leaved form which had made very good growth in his heavy soil.

Three specimens of Verticordia Sp. aff. staminosa H were lost from Phytophthora but two others H have survived and are currently in flower. Col. Thorley also reports losing his specimen.

Verticordia sp. aff. helichrysantha H was lost. There was evidence of Phytophthora and also some pot induced root knuckling which could have contributed.

My biggest blow was the loss of Verticordia grandis. I have not lifted it yet for root examination as the species has been reported, on occasion, to regain lost vigour, but I am not at all hopeful this time. The plant was in the heavy bed and had grown and flowered well since the end of 1985.

Verticordia species which have weathered the conditions satisfactorily include:- acerosa (H and L), brachypoda L, chrysostachys (H and L), drummondii (H and L) - 2 forms, fastigiata, Species aff. helichrysantha H, (Fitzgerald R. N. Pk. form), huegelii prostrate (H L and clay), huegelii erect (H and clay), huegelii low but erect form H, hughanii L, humilis H, lindleyi L, minutiflora H, sp. aff. minutiflora (L and clay), monadelphica (H and L), nitens H, penicillaris L, polytricha H, sieberi H, sp. nova Woodanilling L, sp. nova Mount Hampton L, sp. nova Murchison River H.

Verticordia pennigera is still a little enigmatic. Specimens have been lost from collar rot in both heavy and light soil beds. Others however have survived in both cases. Malcolm Swanson has observed that this species tends to go into a continuous flowering phase with drastic reduction in stem growth and he proposes to experiment with gibberellins or heavy nitrogenous feeding in an effort to shock them into growth. I have noted the same phenomenon here, one plant having flowered continuously for over 12 months.



MEMBER REPORTS.

Val. McConchie, Emerald, Victoria, says that with the assistance of the Moyles she now has a reasonable collection of *Verticordias* including *penicillaris*, *lindleyi*, *brachypoda*, *ovalifolia*, sp. *Hollyhock*, *hughanii*, *chrysostachys*, sp. *Casuarina pink*, *drummondii*, *densiflora*, *mitchelliana*, *plumosa*, and *chrysantha*. The latter four are all well established in the garden which has been built up with a 12 inch topping of coarse sand.

The garden does not get any artificial watering even though late summer and autumn this year were very dry.

Juvenile plants are planted out at an early age and protected during winter with pieces of plastic piping 4" diameter x about 5" long.

Dave Gordon, Myall Park, Darling Downs, Queensland, is very pleased to report that the 10 year drought in his area has broken at last with 12" of rain between the New Year and April and all rivers and creeks then in flood. 1987 was the worst year since 1915. He is now encouraged to instal mist irrigation in his glasshouse.

He feels that his lateritic gravelly soils will be ideal for *Verticordia* culture. The climate too is such that plant diseases do not represent a problem.

David Andrews, Canley Heights, N.S.W. whose garden is on heavy based clay loam, has built up his *Verticordia* bed approximately 16" with a yellow loamy sandy subsoil. During recent heavy rains washing disclosed a light inclusion of quartz particles to a maximum size of about 3mm. This has been exposed on the surface giving a white sterile mulch which should, I would think, make his *Verticordias* very happy.

Although his *Verticordias* are all still young plants, most are doing very well with some coming up to flower. During the warmer months he gave them a weekly application of a foliage feed.

So far his only loss has been *Vert. sp. aff. staminosa* which made very good early growth before going down to *Phytophthera*.

*Verticordia huegelii* is about the only species which does not seem to be doing well and I suspect that this relates to the soil type. As noted previously I feel this species is happier in heavier soils.

Nick Derera has pursued the matter of fungal attack on *Verticordia* foliage to some extent and reports as follows:- The whitish bloom which is prevalent on species such as *V. chrysantha var. preissii* under certain weather conditions is in fact one of the powdery mildews. The purple blotching which can debilitate lush stems of species such as *insignis*, *brachypoda*, *plumosa* and possibly *nitens* and *serrata* is, he suspects a species of *Alternaria*. What I have referred to in previous Newsletters as a form of *Botrytis* which can have disastrous effect on plants of *V. huegelii* under certain conditions is, he believes not *Botrytis* but *Sclerosium*.

We will be awaiting his further conclusions on the above later in the year with possibly more positive identification.

H. M. HEWETT MEMBER  
VERTICORDIA STUDY GROUP LEADER.

Derivation of accepted names in Verticordia DC.

<u>V. acerosa</u> Lindl.	Needle-shaped
<u>V. brachypoda</u> Turcz.	Short-stalked
<u>V. brownii</u> (Desf.) DC.	Robert Brown 1773-1858
<u>V. chrysantha</u> Endl.	Golden-flowered
<u>V. chrysostachys</u> Meisner	Golden-spiked
<u>V. cunninghamii</u> Schauer	Alan Cunningham 1791-1839
<u>V. densiflora</u> Lindley	Densely-flowered
<u>V. drummondii</u> Schauer	James Drummond
<u>V. etheliana</u> C.A. Gardner	Ethel Blackall
<u>V. fastigiata</u> Turcz.	Fastigiata
<u>V. fimbrialepis</u> Turcz.	Fringed-scale (staminodes)
<u>V. forrestii</u> F. Muell.	J. Forrest
<u>V. grandiflora</u> Endl.	Large-flowered
<u>V. grandis</u> Drumm. ex Meisner	Large
<u>V. habrantha</u> Schauer	Dainty-flowered
<u>V. harveyi</u> Benth.	William Harvey 1811-66
<u>V. helichrysantha</u> F. Muell. ex Benth.	Sun-golden-flowered
<u>V. helmsii</u> S. Moore	Richard Helms
<u>V. huegelii</u> Endl.	Baron Karl von Hügel 1795-1870
<u>V. hughanii</u> F. Muell.	Allan Hughan
<u>V. humilis</u> Benth.	Low-growing
<u>V. insignis</u> Endl.	Outstanding
<u>V. jamiesonii</u> F. Muell.	Dr. James Jameison
<u>V. lehmanii</u> Schauer	Johann Lehmann 1792-1860
<u>V. lepidophylla</u> F. Muell.	Scale-leaved
<u>V. lindleyi</u> Schauer	John Lindley 1799-1865
<u>V. minutiflora</u> F. Muell.	Small-flowered
<u>V. mitchelliana</u> C.A. Gardner	Sir James Mitchell 1866-1951
<u>V. monadelphica</u> Turcz.	Monadelphous
<u>V. muelleriana</u> E. Pritzel	Baron Ferdinand von Mueller 1825-1896
<u>V. multiflora</u> Turcz.	Many-flowered
<u>V. nitens</u> (Lindley) Endl.	Shining
<u>V. oculata</u> Meisner	Conspicuous
<u>V. ovalifolia</u> Meisner	Elliptical-leaved
<u>V. oxylepis</u> Turcz.	Sharp-scale (staminodes)
<u>V. patens</u> A.S. George	Spreading
<u>V. penicillaris</u> F. Muell.	Penicillate
<u>V. pennigera</u> Endl.	Bearing-feathers
<u>V. pholidophylla</u> F. Muell.	Horny-scale-leaves
<u>V. picta</u> Endl.	Painted
<u>V. plumosa</u> (Desf.) DC.	Plumose
<u>V. polytricha</u> Benth.	Many-haired
<u>V. preissii</u> Schauer	Dr. Ludwig Preiss 1811-83
<u>V. pritzelii</u> Diels	Dr. Ernest Pritzel 1875-1946
<u>V. rennieana</u> F. Muell & Tate	Dr. Rennie 1852-1927
<u>V. roei</u> Endl.	John Roe 1797-1878
<u>V. serrata</u> (Lindley) Schauer	Serrate
<u>V. sieberi</u> Diesing ex Schauer	Franz Sieber 1789-1844
<u>V. spicata</u> F. Muell.	Spicate
<u>V. staminosa</u> C.A. Gardner & A.S. George	Prominent Stamens
<u>V. stelluligera</u> Meisner	Bearing a small stellar
<u>V. stenopetala</u> Diels	Narrow-petalled
<u>V. verticillata</u> N. Byrnes	Verticillate