

Australian Plants

Registered by Australia Post
Publication No. PP226253/00017

December, 1995
Vol. 18, No. 145

\$3.60



Feather Flowers or *Verticordia* are difficult to grow although the article opposite does not indicate this. Many have found that a wide range of the more showy Western Australian wildflowers are unreliable in their gardens. It is time we tackled this problem in an informed way and this issue is a start. Read the articles and inform me of any ideas you have formed. I will then arrange to have all leads investigated scientifically.

For those without special expertise or experience, I suggest that these articles contain answers to many of the problems you will find with a wide range of plants.

Verticordia is a large group of plants. With the publication of the scientific review by Alex George we are at last able to get the names right. How does a reader, unfamiliar with scientific terms do this? Even those who think this periodical is too technical for them will be able to identify *Verticordia* species if they are prepared to go to a little bit of trouble. A lot of effort has gone into the preparation of this issue to make this easier. One way is to look at the pretty pictures and see which one most closely resembles the specimen to be identified. There will be a reference to a page where similar species are quoted and how similar species differs from the photograph. Move one step up in effort, examine the basic features of a flower on page 201 giving the very minimum in botanical terms you will need. Pull your flower apart and complete this lesson in botany.

Conservation of the Australian Continent and our way of life

There remains a huge gulf of ignorance between our politicians and the general public when it comes to the concern for the maintaining our way of life beyond 2000. The general public is uneasy, feeling we are inevitably heading towards doomsday without our politicians even being aware of the brittle fabric of our continent. Much political propaganda goes into the expensive efforts to conserve those life forms that are classified "endangered" or "rare" while the remaining natural life forms are heading for extinction.

The tragedy is not that our scientists do not know or cannot find out the natural remedies to control deterioration of the continent and its life forms, but that nobody will listen to them. Every year there are conferences attended by those who can afford it, where papers are presented defining the problems and possible solutions but the authors know that they are largely ignored by our leaders when it comes to definitive action for a long-term result.

Politics being what it is, it is the short-term 3-5 year plans that attract votes, that are adopted. We have a proposal for a management plan for our continent for the year 2000 and beyond for adoption as a major objective of the pending celebration of 100 years of Commonwealth Government in Australia but nobody in Canberra will even give us a hearing.

CONTENTS OF THIS ISSUE

<i>Verticordia</i> Garden, Our Garden No. 23	N. J. and P. Moyle	191
<i>Verticordia</i> In The Garden	H. M. Hewett	194
The <i>Verticordia</i> Flower and Floral Characteristics	Elizabeth George, Margaret Pieroni and W. H. Payne	201
<i>Verticordia</i> Garden Cultivars	Australian Cultivar Registration Authority	204
<i>Verticordia</i> Seed	A. Cochrane and C. McChesney	206
<i>Verticordia</i> Cultivation Research	A. Cochrane and C. McChesney	207
<i>Verticordia</i> Cultivation, Our Garden No. 24	Judy Grown	210
<i>Verticordia</i> — The Species	H. M. Hewett	214

COVER PLATE *Verticordia serrata*, photographed by Margaret Pieroni. See page 218 for a description and page 201 for preferred growing conditions.

AUSTRALIAN PLANTS No. 145 issue of Volume 18, comprising issues 141-148. International Series Index ISSN 0005-0008. A national publication in 10,000 copies. Published by The Society for Growing Australian Plants NSW Ltd, A.C.N. 002 680 408.

Available to members or by subscription of \$18.00 (A\$30.00 overseas), including postage to your address. Send to Australian Plants, P.O. Box Padstow, NSW, 2211.

Publication date of previous issue No. 144 was 10th August, 1995.

Verticordia Garden

Our Garden No. 23

by N. J. and P. Moyle

Our 2.2 hectare block gradually rises to the back, from where the Darling Scarp is visible. We are about 3.5 kilometres from the ocean so the garden is subjected to coastal winds. The soil consists of deep yellow sand under a light covering of grey top soil. The house is approximately in the middle.

The natural vegetation consists mainly of Jarrah, *Casuarina* and *Xylomelum* with the odd Tuart, and understorey of *Anigozanthos manglesii*, *Hibbertia hypericoides*, *Epacridaceae* sp., *Stylidium* sp. and *Acacia* sp. *Acacia pulchella* was in abundance as the block had previously been park land bulldozed, which also brought in veld grass and lupins. The indigenous *Banksia* are *B. attenuata*, *B. menziesii* and *B. grandis*, to which we have added another 28 species. Fifteen species of orchids have shown themselves over the 10 years we have been here.

Around the house we have built up rockeries containing small plants such as *Thryptomene*, *Hypocalymma*, *Calytrix*, and small growing *Verticordia*, particularly *V. staminosa* subsp. *staminosa* that does very well in a built up rockery situation. This extends out with taller growing shrubs including *Hakea*, *Melaleuca*, *Grevillea* and *Banksia*, with understorey plants in between such as *Beaufortia*, *Petrophile*, *Darwinia*, *Plleanthus*, *Calytrix* and of course *Verticordia* (the last three have seeded in). We have planted two beds of the Stirling Range *Darwinia* species under the shade of the Jarrah trees and *Casuarina*, where they appear to grow quite happily. To the bush areas we have added numerous *Eucalyptus*, *Hakea* and *Banksia*.

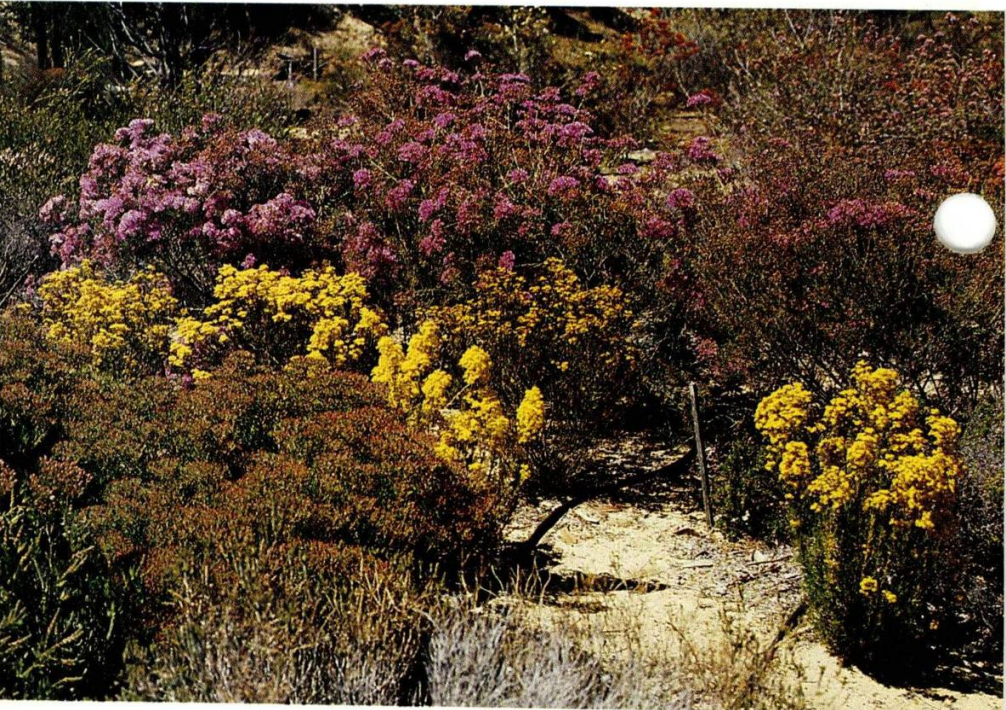
Our first love is *Verticordia*. About half an acre at the top of the block was bulldozed level to bare yellow sand before we came here. It is on this sand pad we have mass planted most of the species of *Verticordia* we are growing, and with the best results for most of them. Elsewhere we grow with least disturbance to the natural vegetation. In the 10 years since we have been here a few of the original plantings have died of old age or adverse conditions and perhaps over fertilisation at the time of planting. These spots are now being replaced, but at wider spacing. The replanted *Verticordia* being mainly from interesting looking self sown seedlings and what rare and difficult species we have collected over the years.

We have in cultivation about 130 species, subspecies and varieties of *Verticordia* of which 50 have seeded in. This occurs generally after three years of the species being planted. Because plants are now growing in close proximity to each other they have cross pollinated and a few nice hybrids have eventuated. *Verticordia picta*, *V. halophila*, *V. blepharophylla*, *V. hughanii* and *V. staminosa* have done so well they have almost become weeds; particularly *V. picta* that we find flowering in odd places, and together with *V. hughanii* and *V. staminosa*, do not appear to hybridise. In the winter of 1994 about 1 500 selfsown seedlings were potted up — some of which have been planted out. Quite a few have died in the tubes — mainly due to mildew caused by our very hot humid weather this year. Initially about 70 *V. grandis* were planted, mainly too close together. A few have died and some were pulled out. This species needs pruning fairly regularly, say every two years to look and flower well and it is not advisable to plant too closely. One side of the driveway was planted with numerous *V. mitchelliana* and behind them pink and white *V. monadelpha*, see photograph on page 213. They have given us untold pleasure.



△ The Moyle garden from the front, left to right, *Chamelaucium* species, Black Kangaroo Paw, *Macropidia fuliginosa*, and *Hakea* yet to flower, centre, *Verticordia mitchelliana* (red) and *Verticordia cooloomia* (yellow) in front of *V. hughanii* (red) and *V. pulchella* (red) with *Anigozanthos rufus* on left.

▽ Front to back, *Verticordia monadelpha* var. *callitricha* yet to flower, *Verticordia chrysanthella* (yellow) in front of, from the left *V. spicata* (pink), *V. chrysanthella* (yellow) and *V. chrysantha* (orange) in front of *V. monadelpha* (pink/red) and *Pileanthus* at rear right.





△ The Moyle rockery from the front; *Thryptomene stenophylla* yet to flower, *Verticordia pulchella* (red), *V. pencillaris* (white) and *V. pulchella* (red), centre from left, *Verticordia staminosa* without flower, *V. brachypoda* (pink), *V. penicillaris* (lemon), *V. roei* (white), *Calytrix tetragona* (pink), *Conostylis* species and *V. roei* (white), from left, *V. acerosa* (yellow), *V. pulchella* (red), *V. acerosa* (yellow), *V. picta* (pink) and the red/pink of *Pileanthus peduncularis*, with *Baeckea* and *Grevillea filifolia* in the background.

▽ *Verticordia pennigera* is the row of pink bushes across the front with *V. monadelpha* the white form in a row behind almost hiding *V. monadelpha* (pink) and its variety *calitricha* in white display. The rear has *V. chrysostachys* (yellow), *V. muelleriana* (pink), the red of *Pileanthus peduncularis* in the centre and *V. ethelliana* on the left side. The rear comprises *V. chrysostachys* and *V. aurea* (yellow) with *V. cooloomia*, *V. dichroma*, *V. chrysostachys*, *V. muelleriana* and *V. fragrans*.



Our favourite *Verticordia* are *V. chrysostachys* species, *V. picta*, *V. albida*, *V. oculata*, *V. grandis*, *V. etheliana* species, *V. monadelpha* species, *V. fragrans*, and *V. chrysanthella*. It has become a source of wonder to us that some of the more difficult species of *Verticordia* do grow, after struggling against mildew etc., for 3–4 years, will acclimatise to our conditions, brighten up and flower well, e.g., *V. brachypoda*, *V. stenopetala*, *V. insignis* and *V. pityrhopis*.

In the time we have been here, the bird population has increased three fold, not always to our satisfaction as the Ringneck parrots create havoc to the flowering plants, particularly to the *Eucalyptus*, *Verticordia grandis*, *V. mitchelliana*, and *V. chrysostachys*. Also moths, bees, butterflies and native bees abound at certain times of the year and must help with cross pollination. ■

Verticordia in the Garden

by H. M. Hewett*

Except for a few tropical species which occur across the top of Australia and which to date have resisted establishment in the southern states, *Verticordias* are endemic to the south-western winter-wet corner of the continent. As might be expected, their introduction to areas with opposing weather patterns is not without problems. However, until comparatively recent times, very few species have been successfully established even in their own climatic region. As with many other examples of Western Australia's outstanding flora, once thought to be difficult because of climatic variation, but now becoming well known in the summer-wet regions of eastern Australia, the growing of *Verticordia* may now be contemplated by those prepared to give that little extra thought and effort.

It has become evident that many parameters are common to both summer and winter-wet areas. Many species are now being grown successfully throughout Australia. With others we have had only partial success but this will serve as a basis for more research into better long-term establishment.

Grafting** treatment has also proved very worthwhile for some species which have shown sensitivity to soil-borne pathogens. More general commercial application will increase the popularity of the genus of these beautiful wildflowers as they could then be grown without provision of special conditions. This article will illustrate the severe restrictions faced in their horticultural application.

Many cultural matters influence plant performance of species from Western Australia when grown in the eastern states such as fertilising, time of planting in various climatic zones, response to dry winter and early spring conditions, especially in summer-wet areas, plant aspect, etc. Early research has been directed predominantly towards identification of the basic major hazards.

***Editors note.** Max Hewett is leader of our *Verticordia* Study Group. He has had experience in the cultivation of a wide range of wildflowers over thirty years and has received acclaim for his competent observation and recording of growing conditions.

****Grafted plants.** Most of the major problems outlined can be overcome by grafting these showy plants on to hardy root stock. The leader in this activity is undoubtedly Doug McKenzie of Ocean Grove, Victoria. Some would say that Doug has been the leader in the application of grafting of Australian wildflowers for many years. He has found that *Darwinia citriodora* (D on the list on page 199) and Geraldton Wax, *Chamelaucium uncinatum* (C on the list) are reliable root stocks and his experiences are summarised on the table of cultivation requirements, page 199.

Major hazards in growing Western Aust. plants, especially *Verticordia*

These are recognised as root rot, collar rot and mildew, moulds etc. Chemical treatments may be appropriate at times but research to date has concentrated predominantly on the achievement of control by physical considerations.

Root rot of garden shrubs

Root rot is destruction by soil borne pathogens which attack root structures. It results in plant inability to take up moisture and nutrients from the soil. This hazard has confronted gardeners from time immemorial. With specific attention to soil type and drainage this hazard can be controlled reasonably well. It is a particular problem with some *Verticordia* species in summer-wet areas.

The traditional gardening response has been to improve drainage conditions, and mounding of beds has certainly proved worth-while. With some *Verticordia*, particularly in late summer when the soil is warm and moist, inadequate speed of drainage as well as the depth can be a significant factor. Compacting with time, particularly with soils in the medium to heavy range, may be a problem. Initial planting procedures can be important and my recommendations are given on page 199. Some species such as *Verticordia chrysostachys* var. *pallida* have made very good early growth in finely textured, well mounded loam but slow drainage speed has proved inadequate in late summer. *Verticordia picta*, is reliable in light sand or sand and gravel to a depth of about 30 cm over heavy base, but has been difficult to establish otherwise.

A reasonable guide to preferred soil type may be assessed from observation of the initial root development of species at the propagation stage. Where first roots emerge predominantly horizontally or at least shallow it is probable that the species will do well in heavy soils. Varieties of *Verticordia huegelii* in this category have adapted well in quite heavy clay loams. Where the first root development tends to be predominantly vertical, lighter soils have generally proved more appropriate.

Some *Verticordia* species may develop a lignotuberous root system and are less troubled by problems of root rot. *Verticordia chrysanthella* is one such species which has done well in both light and heavy soils.

Collar rot of garden plants

Collar rot is attack by soil-borne pathogens to the plant stems, at or near surface level. Destruction of the outer section of the stem known as the cambium layer, results in the inability of the plant to transfer moisture or nutrients between the root system and the foliage. In summer-wet areas such as eastern Australia this hazard can be a major problem with many garden shrubs, especially many western plants such as *Verticordia* that have evolved in a summer dry climate.

Factors effecting collar rot include mulching of the soil surface around the plant, watering methods and for *Verticordia*, in my opinion, potting mixes and plant dormancy. Of these the surface condition of the soil is the more apparent difference between growing in summer-dry and summer-wet areas. In the west the summer dry period, as well as extending well into autumn, is generally hotter, and the hazard of collar rot is reduced. This is the establishment period of young plants and vegetative surface mulches created by leaf litter are an advantage.



△ *Verticordia albida* (see page 231)
Photography by E. A. George

▽ *Verticordia grandis* (see page 230)
Photography by M. Pieroni



In summer-wet areas **vegetative mulches** appear to be a source of collar rot attack. The adoption of more sterile surface conditions using gravel mulches or by permitting undisturbed natural weathering in the case of gravelly soils, has done much to alleviate this collar rot problem.

Many *Verticordia* flower from late spring well into summer and before flowering they will respond favourably to summer rain or hand watering.

Flowering is frequently followed by some degree of **dormancy** and the humid late-summer conditions which prevail in eastern areas coincides with this rest period. This can place collar rot susceptible species under additional stress.

It has been observed with some species, in the higher range of susceptibility to collar rot attack, that failures have occurred due to the moisture-holding capacity of the **potting mix** used initially in the nursery stage. It has seemed that this has later contributed to collar rot problems in holding more moisture than desirable during summer-wet conditions, in the region of the plant stems. My solution to this is given in Planting Procedure on page 199.

To maintain sterile surface conditions around planted specimens it is sometimes necessary to **clear a plant's own leaf litter** away from plant stems should excessive summer drop occur. *Verticordia staminosa* ssp. *cylindracea* var. *erecta* is one such species which, although generally quite hardy and reliable can be vulnerable to attack under wet late-summer conditions. Growth response to wet weather throughout the year is good with dense leaf production. It is one of the earlier species to flower in dry conditions in early summer and when flowering has finished, heavy leaf drop can lead to collar rot attack.

Hand **watering** can increase the risk of attack with some species. *Verticordia* have shown very good tenacity under hot and dry summer conditions and mature specimens, particularly in eastern Australia, have generally proved quite capable of surviving without such attention. An exception can arise where very shallow rooted species have been grown in light sandy soil and the entire root system is in danger of drying out. Watering should be maintained during the establishment stage should dry conditions prevail. In the cooler part of the year hand watering may safely be done throughout the day. When species are in flower it is best to water below the foliage to avoid flower damage. During hot weather water in early mornings so that excessive moisture is not retained around plant stems for long periods. Do not water late or overnight, when most collar rot problems start. It is also important that watering be done on occasions when the weather conditions later in the day could be expected to dry the surface quickly such as from wind, hot temperatures or low humidity. Trickle watering has sometimes been used; in light sandy beds it can be difficult to obtain adequate moisture distribution through the soil and spraying may be more appropriate.

Mound specimens slightly at planting time, and form slight depressions between plants. As well as helping to throw excess water away from the vulnerable stem areas and thereby effect faster surface drying after rain, the depressions can also be useful in training water deeper into the soil where it may do more good. Such treatment furthermore tends to reduce general surface scour in heavy rain.

Mildews, Moulds, etc.

Fungal attack on the stems or leaves is a hazard when cultivating some plants resulting in plant debilitation and, at times, death. This hazard can be more difficult than root and collar rot to control and grafting on to hardier rootstock does not avoid the problem. Attack appears to be related more to seasonal conditions than to geographical division into summer or winter-wet regions. On some plants the effects are relatively minor and may only cause temporary damage even if no counter measures are taken.

For *Verticordia* fungal attacks occur more frequently in summer-wet areas and wetter than usual summer conditions in other areas. In summer-wet areas some of the yellow-flowered species are particularly susceptible in autumn to mildew attack although when late summer weather patterns are drier than usual the problem is much less evident. *Verticordia chrysanthella* is such a species and although debilitation may be quite appreciable in some years, with defoliation, recovery may generally be expected later during winter and spring. It appears to be caused, not so much by the wet, late summer conditions to which the plant may have responded with lush new leader growth, but to the effect on such growth a little later in autumn, from widely-contrasting drier weather, and while night temperatures are still moderate. One approach is to do nothing and await natural recovery. Healthy new growth can be expected to return in several weeks with the advent of cooler and wetter conditions. You could lightly prune off the recent lush leader growth, thereby delaying the start of new seasonal development by a month or so. As a last resort chemical treatments with fungicides such as mancozeb or Triforine can assist control. Relatively minor attacks may occur on a few of the pink-flowered species such as *Verticordia plumosa* or *Verticordia monadelphae* but these will grow out later as weather conditions become cooler and wetter.

In near-coastal, summer-wet areas, *Verticordia mitchelliana* almost invariably suffers debilitation with serious leaf-drop in late summer. In inland districts the problem is rarely evident. The leaf-drop noted is usually rapid and comes at the end of a strong summer growth period during which the leaves have appeared almost succulent. The problem follows a change in weather pattern to cooler, less humid conditions and appears to start with fungal attack at leaf junctions with the stems. The leaf drop is slightly less severe when the seasonal weather change is gradual rather than abrupt. Treatment with fungicides has failed.

All three species in *Verticordia* Section *chrysorrhoe*, viz. *V. nitens*, *V. aurea* and *V. patens* are particularly susceptible to foliar fungal attack. For *V. nitens* it can be extremely debilitating leading to rapid total collapse of the specimen, and such losses are not restricted to summer-wet areas. The natural growth habit is to produce very tall, fast-growing but softwooded flower stems. These stems are very susceptible to attack, the first indication of which is a purplish discoloration of the new growth a few inches below the growing tip. The only counter seems to be early pruning of rapidly growing softwooded stems to induce multiple branching. The plant form is then changed to that of a multi-branched lower shrub, which although still susceptible to fungal attack, is considerably more tenacious. In summer-wet areas the fungal attack is generally still severe enough to present a debilitated appearance. *Verticordia aurea* and *V. patens*, although not so badly affected as the above, are still difficult species to maintain, especially in summer-wet areas. The fungal attack occurs predominantly on the new leaves and stems causing severe debilitation with stem purpling.

Planting procedure

Potting mixes are very different in texture, nutrient value and moisture holding capacity from the soils to receive the plant. Preplanting preparation of *Verticordia* plants has been used to advantage for location compatability and to provide greater resistance to root and collar rotting pathogens. Harden the plant in a pot of soil similar to that of its intended location. For advanced purchased plants, they are first bare-rooted, any root coiling removed and then lightly pruned. After repotting they should be staged in favourable conditions until new vigorous growth develops. Some additional measures have been used to advantage. The soil is not pre-cultivated but rather left in the compacted state. This is important for heavy garden conditions. Use a minimum sized hole, water the plant well. Autumn planting is preferred so that subsequent additional watering is not required. It is then given a hard prune. Follow-up treatment is restricted to removal of leggy growth. *Verticordia monadelpha*, *V. attenuata* and *V. pholidophylla* have responded well to this treatment in heavy base soils.

Cultivation of *Verticordia*

(Based on experience in the eastern Australian summer-wet conditions).

Soil type and suitability (Best soil acceptance noted **b**. Other soils in order of preference). H — Heavy clay-loam; M — Medium finely-textured loam; L — Deep light sand; G — Predominantly gravel, Deep with loamy-sand matrix; S — Sandstone parentage with high percentage of sandstone rubble; HL — Heavy-loam base with sand mixed into top 18 cm (medium depth root development); LM — Deep sand with medium loam mixed into top 18 cm (for deep root development).

Susceptibility to root rot, collar rot and to mould, etc. nil means no problem recorded; **Pl**, light attacks noted, **Pm**, moderate attacks, **Ps**, severe attacks noted.

Index to species — The species are described on this page. **Grafted** on rootstock, see page 211.

All the species See column 6 for description	Best soil type	root rot	collar rot	mould	descr. page	grafted on to
<i>V. acerosa</i> var. <i>acerosa</i>	Gb, L, HL	nil	nil	Pl	215	Dx Cx
<i>V. acerosa</i> var. <i>preissii</i>	Mb, HL	nil	nil	nil	215	
<i>V. albida</i>	Lb	Pl	Pm	nil	231	C
<i>V. aereiflora</i>					230	
<i>V. amphigia</i>					218	
<i>V. aspecta</i>					224	
<i>V. argentea</i>					230	
<i>V. attenuata</i>	Gb, HLb, L, S	nil	nil	nil	226	C
<i>V. aurea</i>	HLb	nil	Pm	Ps	219	
<i>V. auriculata</i>	Lb, HL	Pm	Pm	nil	227	
<i>V. bifimbriata</i>	Lb	nil	nil	nil	227	
<i>V. blepharophylla</i>	Gb	nil	nil	nil	228	Dx Cx
<i>V. brachypoda</i>	Mb, HLb, H	Pl	Pl	nil	224	Pl
<i>V. brevifolia</i> ssp. <i>brevifolia</i>	Lb	nil	Pm	nil	215	
<i>V. brownii</i>	HLb, L	Pm	Pl	Pl	222	D
<i>V. capillaris</i>					222	
<i>V. carinata</i>					228	
<i>V. centipeda</i>	Lb, HL	nil	Pm	nil	227	
<i>V. chrysantha</i>	HLb, L	nil	Pl	Pl	215	
<i>V. chrysanthella</i>	Hg, Lg, HLg, M	nil	nil	Pm	215	D

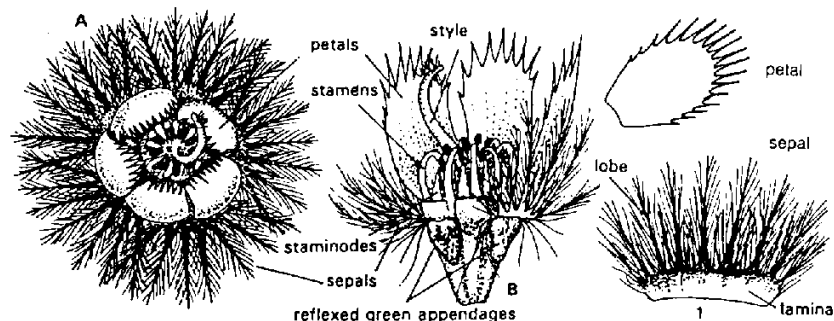
All the species See column 6 for description	Best soil type	root rot	collar rot	mould	descr. page	grafted on to
<i>V. chrysostachys</i>	HLb,	Pl	Pm	nil	230	C
var. <i>chrysostachys</i>						
<i>V. chrysostachys</i> var. <i>pallida</i>	Mb, LM	Ps	Pm	nil	230	C
<i>V. citrella</i>	Mb	nil	Pm	nil	215	
<i>V. comosa</i>					231	
<i>V. cooloomia</i>	HLb, H	Pl	nil	Pl	219	Cx D
<i>V. coronata</i>					218	
<i>V. crebra</i>	HLb, L	nil	nil	nil	221	
<i>V. cunninghamii</i>					226	
<i>V. dasystylis</i> ssp. <i>oestopoa</i>	HLb	nil	nil	nil	223	
<i>V. decussata</i>					226	
<i>V. densiflora</i> var. <i>densiflora</i>	LBb, Mb, HLb, H	nil	nil	nil	222	D
<i>V. densiflora</i> var. <i>cespitosa</i>	HLb, H	nil	Pl	nil	222	
<i>V. dichroma</i> var. <i>dichroma</i>	Lb	Pl	Pm	nil	231	C
<i>V. dichroma</i> var. <i>syntoma</i>	Lb	nil	Pm	nil	231	C
<i>V. drummondii</i>	HLb, L	nil	nil	nil	226	Dx C
<i>V. endlicheriana</i> var. <i>angustifolia</i>	HLb	nil	nil	nil	215	
<i>V. endlicheriana</i> var. <i>compacta</i>	Lb, G	nil	Pl	nil	215	
<i>V. eriocephala</i>	Lb	nil	nil	nil	222	
<i>V. etheliana</i> var. <i>etheliana</i>	HLb, L	nil	nil	nil	230	C
<i>V. euradyensis</i>					231	
<i>V. fastigiata</i>	Hb, HL	nil	nil	nil	222	D
<i>V. fimbrilepis</i> ssp. <i>fimbrilepis</i>	Gb	nil	Pl	nil	221	
<i>V. forrestii</i>					231	
<i>V. fragrans</i>	Mb, G, HL	nil	nil	nil	231	Dx Cx
<i>V. galeata</i>					215	D
<i>V. gracilis</i>					225	
<i>V. grandiflora</i>	Lb	nil	Pm	nil	218	Dx Cx
<i>V. grandis</i>	Gb, HLb	nil	nil	nil	230	C
<i>V. habrantha</i>	Gb, HL	nil	Pl	nil	224	
<i>V. halophila</i>	LHb, M	nil	nil	nil	228	
<i>V. harveyi</i>	L	nil	Ps	nil	221	
<i>V. helichrysantha</i>	HLb	Pl	nil	Ps	221	Dx C
<i>V. helmsii</i>					226	
<i>V. huegelii</i> var. <i>huegelii</i>	Hb, HL	nil	nil	nil	223	
<i>V. huegelii</i> var. <i>decumbens</i>	Hb, HLb	nil	nil	nil	223	
<i>V. hughanii</i>	Mb, HL, L, LM	Pm	Pl	nil	228	
<i>V. humilis</i>	HLb	nil	nil	nil	225	
<i>V. inclusa</i>					224	
<i>V. insignis</i> ssp. <i>insignis</i>	Gb, HL	Pl	Pl	Pl	224	C
<i>V. insignis</i> ssp. <i>compta</i>	HLb	nil	Pl	nil	224	
<i>V. integra</i>					219	
<i>V. interioris</i>	Lb	nil	Pm	nil	226	
<i>V. jamiesonii</i>					226	
<i>V. laciniata</i>					218	
<i>V. lehmannii</i>	HLb, L	nil	Pm	Ps	225	D
<i>V. lepidophylla</i> var. <i>lepidophylla</i>	HLb, G, L	nil	nil	nil	231	
<i>V. lindleyi</i> ssp. <i>lindleyi</i>	HLb, L	nil	nil	nil	228	Dx C
<i>V. lindleyi</i> ssp. <i>purpurea</i>	Gb, L	Pl	nil	nil	228	
<i>V. longistylis</i>	Hb, HLb, Mb	nil	nil	nil	223	D
<i>V. luteola</i>	Gb, L	nil	nil	nil	227	
<i>V. minutiflora</i>	Hb, HL	nil	nil	nil	222	
<i>V. mitchelliana</i>	Sb, G, HL	Pm	nil	Ps	225	D
<i>V. mitodes</i>					227	
<i>V. monadelpha</i> var. <i>monadelpha</i>	Gb, HL, S, LH	nil	nil	Pl	225	D
<i>V. monadelpha</i> var. <i>callitricha</i>	Lb	nil	nil	nil	225	D
<i>V. muelleriana</i> ssp. <i>muelleriana</i>	Mb, L	nil	nil	nil	230	C
<i>V. multiflora</i> ssp. <i>multiflora</i>	HLb, L, S	Pl	Pl	nil	224	Dx
<i>V. nitens</i>	HLb	nil	nil	Ps	219	Dx
<i>V. nobilis</i>	HLb, G	nil	Pl	nil	218	
<i>V. oculata</i>	Lb	nil	Pl	nil	230	Dx Cx
<i>V. ovalifolia</i>	HLb, L	nil	Pm	nil	228	Dx C
<i>V. oxylepis</i>	HLb, L	Pl	nil	nil	223	D
<i>V. paludosa</i>					227	

All the species See column 6 for description	Best soil type	root rot	collar rot	mould	descr. page	grafted on to
<i>V. patens</i>	Lb	nil	PI	Ps	219	
<i>V. penicillaris</i>	Sb, L	nil	nil	PI	223	D
<i>V. pennigera</i>	Gb, HL, L	PI	nil	nil	228	C
<i>V. pholidophylla</i>	Hb, L	nil	nil	nil	227	C
<i>V. picta</i>	Lb, Gb	PI	nil	nil	225	C
<i>V. pityrhopis</i>					221	
<i>V. plumosa</i> var. <i>plumosa</i>	Lb, HLb, H	nil	nil	nil	221	Dx C
<i>V. plumosa</i> var. <i>ananeotes</i>	HLb	nil	nil	nil	221	
<i>V. plumosa</i> var. <i>grandiflora</i>	LMb, G	nil	nil	nil	221	
<i>V. plumosa</i> var. <i>pleiobotrya</i>	Gb, HL	nil	nil	nil	221	
<i>V. plumosa</i> var. <i>vassensis</i>	Mb, L, G	Pm	Ps	nil	222	
<i>V. polytricha</i>	HLb	nil	nil	nil	222	
<i>V. pritzellii</i>	HLb	nil	PI	nil	224	D
<i>V. pulchella</i>	Sb, G, L	nil	nil	nil	225	Dx
<i>V. rennieana</i>	Lb	PI	nil	nil	226	Dx Cx
<i>V. roei</i> ssp. <i>roei</i>	Gb, LMb	nil	Pm	PI	224	
<i>V. roei</i> ssp. <i>meiogona</i>	Lb	nil	Pm	PI	224	
<i>V. rutlastra</i>					218	
<i>V. serotina</i>					231	
<i>V. serrata</i> var. <i>linearis</i>	HLb	nil	Pm	nil	217	Dx
<i>V. serrata</i> var. <i>ciliata</i>	HLb	PI	Pm	nil	218	
<i>V. sieberi</i> var. <i>sieberi</i>	HLb, G	PI	Pm	nil	221	
<i>V. spicata</i>					227	Dx Cx
<i>V. staminosa</i> ssp. <i>staminosa</i>	Lb, G	PI	Pm	nil	219	D
<i>V. staminosa</i> ssp. <i>cylindracea</i>	Gb, HL, L, M, H	PI	PI	nil	219	
<i>V. stenopetala</i>					221	
<i>V. subulata</i>					215	
<i>V. tumida</i> ssp. <i>tumida</i>	Gb, HL	PI	PI	nil	227	
<i>V. venusta</i>	Lb	PI	Pm	nil	230	C
<i>V. verticordina</i>					223	
<i>V. verticillata</i>					226	
<i>V. vicinella</i>	Lb	nil	nil	nil	222	
<i>V. wonganensis</i>					226	

The *Verticordia* Flower

by W. H. Payne,
Elizabeth George and
Margaret Pieroni

To many a flower comprises colourful petals surrounding a number of mysterious parts that mature to a capsule containing seed for the next generation. This would describe the *Verticordia* flower but let us spend a few minutes and examine the various parts of this exquisite decorative flower.



If this is getting too technical for you we suggest you see the colour photographs in this issue that show the flower detail in close up on pages 208, 212, 216, 217 and 232. You will note how different groups of species differ in the presentation of their floral parts and this serves as a basis for botanical classification as described later.

The centre of a regular flower such as this is the female part which in this case is a spike, known as the **style**, on top of the **ovary**. When suitable pollen contacts the top of this style, it grows like male sperm down the central hollow tube to the **ovules** in the ovary at the base. When the ovules are fertilised, they mature as the flower dies to become **seed** in the expanding ovary case then known as the **fruit** of the plant. The form of the **style** will vary with different species, as shown in Fig. 2, the type Sy1 opposite.

The central **style** is surrounded by the **stamens** which carry the **pollen** on their tips. In Fig. 1b, two of the petals (and sepals) have been removed to show the ring of stamens with their dark heads, surrounding the style. There may be 10 stamens. The attachment on top is often a distinctive colour and is known as an **anther**. They contain the pollen grains in pouches, the different shapes as in Fig. 2-An being a guide to different species. Between each stamen is what is believed to be an aborted or modified sterile stamen without the anther appendage, known as a **staminode**. Different shapes are in Fig. 2-Se.

Five **petals** cup the stamens and style, their colour and shape formed by nature to entice the various creatures to seek out the tasty pollen and hopefully to distribute a few grains. Access is constrained such that a few grains of pollen are deposited on to the creatures body or head in such a way that it is deposited on the next flower visited. In Fig. 1 the fringe of the petal is toothed as in Fig. 2-Pl3 but this shape may vary with different species.

Five **sepals** surround the petals, each having a feathery edge giving *Verticordia* flowers their characteristic Feather Flower appearance.

Auricles are appendages usually at the base of the petals (as in Fig. 2-P4) or the sepals (as in Fig. 2-Sl3), an additional frill to decorate the flower. They are obvious on only a few species, three different shapes being shown in Fig. 2-Au.

The **hypanthium** is the swelling on top of the flower stalk (peduncle) that holds the flower. It may vary in shape, in this case in the shape of a top, some being ribbed. In Fig. 1b there are characteristic bumps or appendages which are found on some species.

Bracts are modified leaves that often enclose the hypanthium, hiding it. In Fig. 1 the bracts have been removed but they are shown in Fig. 2Br.

***Verticordia* — Floral Characteristics** as shown in the sketches opposite

Fig. 2A — The **flower** from above showing radiating sepals with feathered lobes, entire petals, toothed at apex and incurved towards style, stamens incurved with anthers almost reaching the style, pointed staminodes between each stamen and a style (Sy₃) with a short tuft of hairs below the minute stigma.

Fig. 2B — Side view of the **flower** with two sepals and petals removed revealing 5 reflexed green appendages attached around top of hypanthium.

Fig. 2-Sl — **Sepal**, various types including one (Sl₃) with an auricle attached to its base. Sl₁, fringed (fimbriate), showing lobes attached to the lamina. Sl₂, feathered (plumose). Sl₃, deeply divided (ciliate), showing reflexed basal auricle (ear-like lobe). Sepals may also be intricately (divaricately) divided.

Fig. 2-Pl — **Petal**, various types including one (Pl₄) with an auricle attached to its base. Pl₁, entire, showing margin and the lamina. Pl₂, fringed all round with long hairs (ciliate). Pl₃, fringed and serrated partly down sides (fimbriate to serrate). Pl₄, fringed with short hairs and serrated to base, showing basal auricles. Pl₅, evenly to unevenly toothed across apex (dentate to erose) and entire sided. Pl₆, deeply divided into lobes like the fingers on a hand (digitate). Pl₇, double fringed to roughly serrated on sides.

Fig. 2-Au — **Auricle**, various types. Au₁, semi-circular or rounded, joined at top. Au₂, oblong or narrow, joined at top. Au₃, circular, joined at back (peltate), usually covering the hypanthium. Auricles are sometimes reduced to a few long simple hairs.

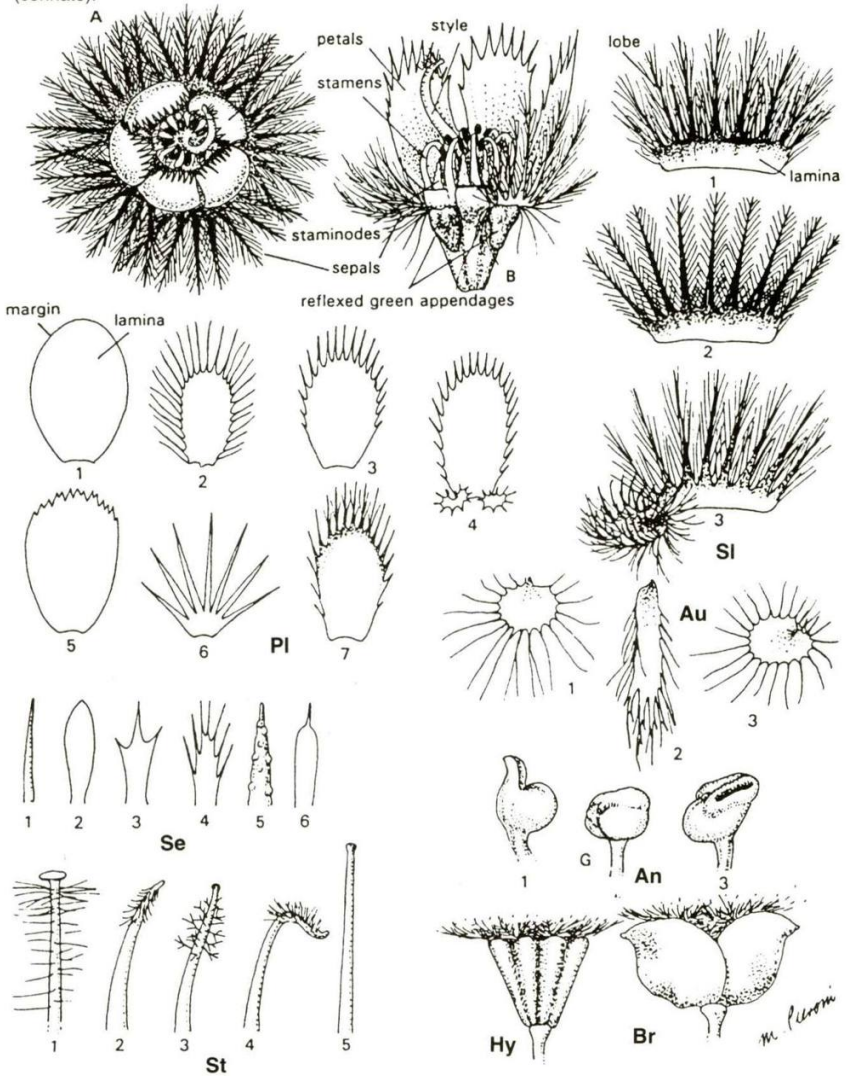
Fig. 2-Se — **Staminodes**, which alternate with stamens to form a "crown" around the style. Se₁, needle-shaped (terete). Se₂, broad and flat with a blunt tip. Se₃, 3-toothed or lobed. Se₄, fringed. Se₅, needle-shaped (terete), glandular warty. Se₆, broadly linear, abruptly narrowed with a sharp point.

Fig. 2-An — **Anthers**, at apex of **stamens**. An₁, pouch-shaped, 2 pores opening near top, with an apical appendage. An₂, globular, 2 pores without apical appendage. An₃, oblong, opening by 2 slits.

Fig. 2-Sy —**Styles**. Sy₁, straight with cap-like (capitate) stigma, bearded all round (lateral) with long straight simple hairs. Sy₂, curved and tapering without cap-like stigma, bearded below tip with reflexed short fine hairs. Sy₃, slightly s-shaped with small capitate stigma, bearded laterally with forked hairs. Sy₄, bent like an elbow or crook (geniculate), bearded on one side only (unilateral) with stiff hairs. Sy₅, without hairs (not bearded). The style may also be strongly s-shaped (sigmoid).

Fig. 2-Hy —**Hypanthium** in this case ribbed and without hairs (glabrous).

Fig. 2-Br —**Bracteoles** persistent, covering the hypanthium, joined together (fused) at base. They can be either persistent (remaining on the open flower) or deciduous (fall off soon after flower opens); either fused to halfway from base and separated above, or fused together to the top and cone-like (connate).



Verticordia floral characteristics.

Verticordia Cultivars

from Australian Cultivar Registration Authority

The following cultivars originated with N. J. and P. Moyle, see page 191.

Verticordia 'Venus Harlequin' was selected from self-sown seedlings in the garden and named for its habit of flowers ageing from cream to magenta. It forms a small open shrub from 45 cm × 19 cm with flowers from November to March. The flowers are red-purple in colour (70A) and 12 mm in diameter. The new flowers are violet (84C) and yellow (158C). The main difference between this plant and its probable parent *Verticordia* sp. aff. *drummondii*, is the flower colour, as *V. drummondii* has pink flowers. The habit of the cultivar is smaller and less wide than *V. drummondii*. It appears to be disease and insect resistant.

Verticordia 'Venus Pink' is a hybrid between *Verticordia blepharophylla* and possibly *Verticordia bifimbriata*, originating in the garden as a self sown seedling. It is an upright open shrub to 45 cm high by 30 cm wide after four years growth. The leaves are light green elliptic, opposite, minutely denticulate at the margin, 3 mm long by 2 mm wide, openly arranged, more sparse on new growth (longer internodes), with small prominent oil glands. The fresh flowers are pink (68B, fading to yellow white 158C) to 14 mm wide held in open terminal spike-like groups to 10 cm long, continuous flowering on new growth provides a gap of 2 cm to 4 cm between spike-like groups. Flowering period in Western Australia is from October to April and intermittent flowering at other times.

Verticordia 'Venus Pink' differs from *V. blepharophylla* in its smaller more open leaves, its larger flowers, flower colour, less dense spike-like flower groups, more continuous flowering period, its more upright growth and smaller stature; differs from *V. bifimbriata* in its more open habit, larger more openly arranged leaves, larger flowering spike-like groups, longer flowering period and lighter pink flowers. This cultivar is moderately drought tolerant, moderately frost tolerant and a good container plant.

Verticordia 'Venus Princess' is a hybrid between *Verticordia tumida* and possibly *Verticordia blepharophylla* originating in the garden as a self sown seedling. It is a dense compact rounded shrub to 45 cm high by 45 cm wide after four years growth. The leaves are medium green, slightly ciliate, opposite, moderately open, 3 mm long by 2 mm wide with prominent oil glands. The fresh flowers are mauve pink to purple (78B, fading to red purple 62D, to orange 159C), to 13 mm across, held in dense terminal spike-like groups to 8 cm long. The flowering period in Western Australia is from November to March.

Verticordia 'Venus Princess' differs from *Verticordia tumida* in its larger and more openly arranged leaves, its larger flowering spike-like groups, flower colour and flowering period; it varies from *Verticordia blepharophylla* in its narrow leaves, with less conspicuous cilia, more dense flower spike-like groups and more intense pink flower colour. This cultivar is drought tolerant and moderately frost tolerant and resistant to foliage and flower fungal diseases.

Verticordia 'Wemm's Find' is a natural hybrid between *V. oculata* and possibly *V. etheliana*, found in the Murchison district of Western Australia. It is a moderately dense, rounded shrub to 35 cm by 45 cm wide after four years of growth. The leaves are moderately dense, orbicular to elliptic, 4–5 mm wide, light green, with prominent oil glands. The pink-mauve-silver flowers (73A) ageing to yellow white (158D) are held in dense terminal spike-like groups to 50 mm long by 20 mm wide. The flowering period in Western Australia is from November to February. This cultivar is moderately drought tolerant, and makes an excellent container plant. ■



△ *Verticordia* 'Venus Princess'

Photographs from P. Moyle

Verticordia 'Wemm's Find' ▽



Verticordia Seed

by A. Cochrane and C. McChesney
Dept Conservation and Land Management
WA Herbarium, Threatened Flora Seed Centre

Verticordia or Feather Flowers are generally single stemmed shrubs of less than 2 m tall. Most have brightly coloured flowers in various shades of yellow, pink, red, orange, white and cream. There are 100 species as listed on page 199 occurring predominantly in the south-west of Western Australia. Generally, they are considered fire-sensitive and regeneration is from seed, although some taxa have a lignotuber and can resprout after fire.

Most *Verticordia* flower in spring and summer, with some in flower during autumn and winter. They provide a wonderfully colourful display in heathlands and woodlands throughout the south-west of Western Australia. Propagation has been mainly from cuttings, although many are grown from seed. Germination of seed occurs from within the old flowers that have fallen to the ground, but each flower rarely produces more than one seed while many have no seed.

The Threatened Flora Seed Centre Research.

Research at the Threatened Flora Seed Centre in Perth with the collection, testing and storage of seed from those rare and geographically restricted plants of Western Australia that are susceptible to the dieback disease *Phytophthora*. Most collected seed comes from plants in the families Proteaceae, Epacridaceae and Fabaceae, although some plants in the family Myrtaceae have now been confirmed susceptible to dieback at certain locations. There is little evidence that the genus *Verticordia* is threatened by dieback, although there are instances of species dying at badly infected sites. The Centre has been collecting rare and priority species from this genus for the past two summer seasons as a safeguard.

Inherent in the storage of rare and threatened species is the requirement that the viability of stored seeds is known. Very little is known about germination of *Verticordia* seed as most plants for horticulture are grown from cuttings. Methods used for germination testing at the Seed Centre involve the use of controlled temperature and light growth cabinets. Seed is placed in glass petrie dishes with either vermiculite or an agar solution. A known amount of seed is required for testing and if possible three replicates are used so that results are statistically valid, reproducible and comparable.

Percentage seed set for 8 species of rare and poorly known *Verticordia*.

Species	Location	Collection date	Percentage seed set
<i>V. albida</i> *	Three Springs	03/01/95	47%
<i>V. attenuata</i>	Capel	13/03/94	26%
<i>V. attenuata</i>	Capel	13/02/95	48%
<i>V. attenuata</i>	Busselton	16/03/95	15%
<i>V. attenuata</i>	Ruabon	16/03/94	10%
<i>V. bifimbriata</i> †	Dryandra	28/01/95	50%
<i>V. endlicheriana</i> var. <i>angustifolia</i>	Mt Barker	15/02/95	11%
<i>V. fimbrialepis</i> ssp. <i>australis</i>	Denmark	13/01/95	14%
<i>V. harveyi</i>	Stirlings	21/04/94	13%
<i>V. helichrysanthia</i>	Cape Riche	22/11/94	33%
<i>V. plumosa</i> var. <i>pleiobotrya</i>	Mundijong	13/02/95	24%
<i>V. plumosa</i> var. <i>ananeotes</i>	Bussleton site 2	16/03/94	3%
<i>V. plumosa</i> var. <i>ananeotes</i>	Bussleton site 1	16/03/94	11%
<i>V. plumosa</i> var. <i>ananeotes</i>	Bussleton site 1	13/02/95	5%

Verticordia Seed Biology

To determine whether a flower has seed we use a cut-test. Using a dissecting microscope, flowers are cut to determine whether there is an embryo or viable seed contained within. The results for eight species, some of which have collections from multiple locations and multiple years, are presented opposite. Seed extracted undamaged is used in germination testing. All cut-tests were conducted using three replicates of 100 flowers to give the mean percentage of seed set, except for two of the species that had only a few flowers collected. For one of these (*) three replicates of 30 flowers was used, and for the other (†) only one replicate of 42 flowers was cut.

The results of these cut-tests indicate that seed set in the genus *Verticordia* is generally low (less than 51%) and varies not only between species but within the same species in different locations and in different years at the same location. Some of the reasons for rarity in plants are linked to environmental factors and to genetic influences such as inbreeding, although in the case of some genera such as *Verticordia* it might be due to low seed set. One hypothesis is that species with larger flowers are more likely to set seed. *V. albida*, *V. bifimbriata* and *V. helichrysantha* have the largest flowers of the species tested, and have some of the highest seed set. However, *V. attenuata* with smaller flowers had for the 1994 collection a low seed set, but high for the 1995 collection.

Verticordia Cultivation Research

at Muechea, WA

by Neville Burton*

Verticordia with common names of Feather Flowers or Morrisons have been extensively bush picked over the past 20 years for the cut flower trade. They are very versatile and can be used as both fresh and dried flowers. The research is intended to promote the commercial cropping of selected forms. It was initiated because of concern about the effect of bush picking on the survival of natural populations of *V. eriocephala*. Surveys have found that where bush harvesting of *V. eriocephala* has occurred, mortality rates range from 50% to almost 100%. Long term monitoring sites have been established at three locations and data collection commenced aimed at formulating a rejuvenation management plan.

The initial planting was of *Verticordia eriocephala* commonly known as "cauliflower", a replicated trial to investigate the effect of time of planting, plant density and different pre-plant application rates of phosphorus and trace elements. A pot trial is also being conducted at South Perth to determine optimum fertigation rates of nitrogen and potassium for *V. eriocephala*. This work should provide some guidelines for the establishment and nutritional requirements of other species of *Verticordia* for cut flower production.

A number of other *Verticordia* are being trialled, plant vigour being on top of our selection criteria. For commercial viability as a cut flower, high and repeatable yields of long stems are very important. It is not much use growing the most attractive flower in the world if it will only produce short stems or one marketable flower per square metre of land per year.

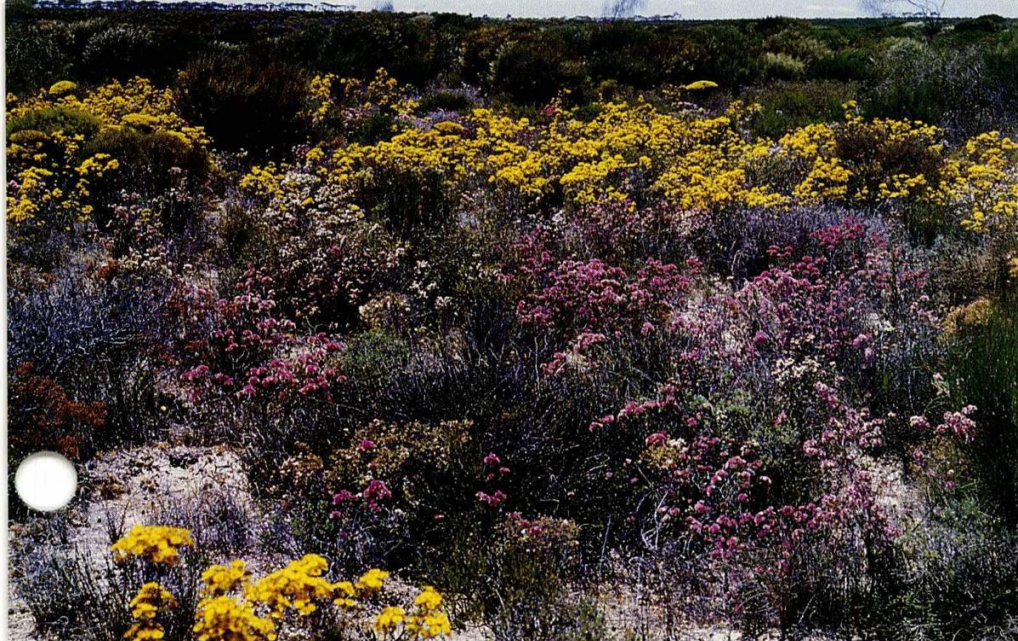
*This is a joint project with the Department of Conservation and Land Management. It is funded by commercial purpose license fees, several Western Australian wildflower export companies and the Horticultural Research and Development Corporation.

We are grateful for assistance by Pat and Norm Moyle of Mandurah, Mary and Basil Smith of Manmanning, Judy and John Growns of Parkeville and especially, Elizabeth George.

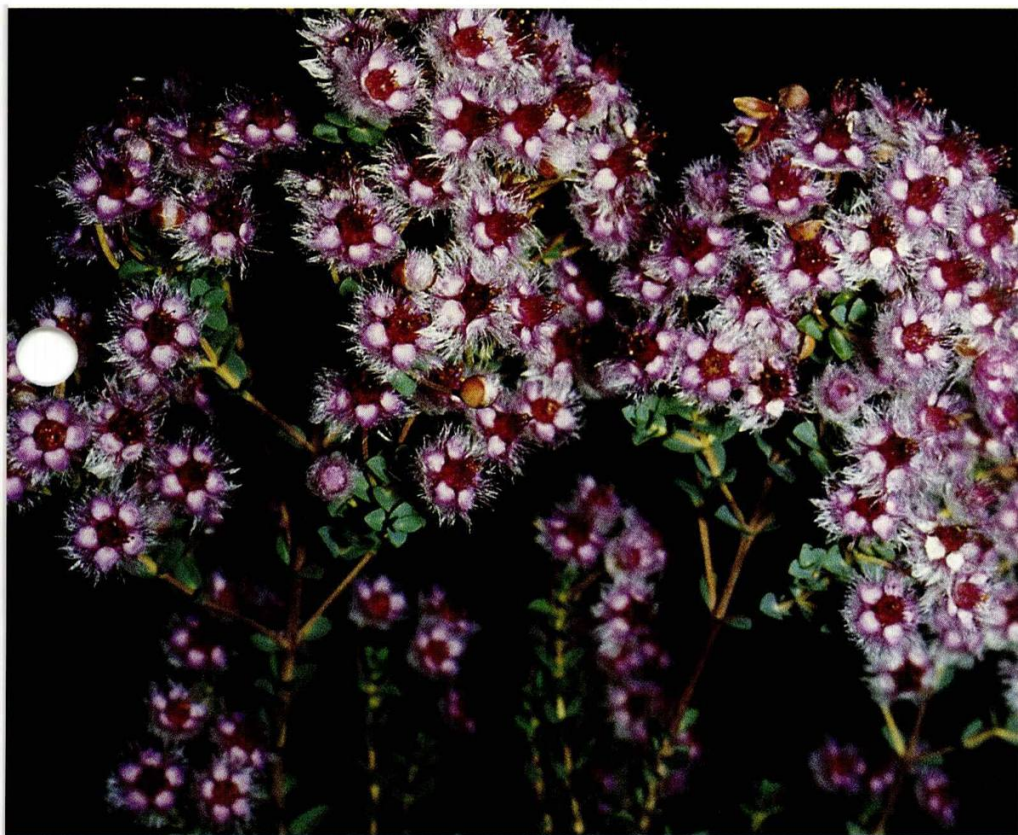


Verticordia ovalifolia (see page 230 for a description) Photography by E. George





△ *Verticordia* growing in the wild. *Verticordia chrysantha* (yellow) is described on page 218.
Verticordia brachypoda (pink) is described on page 223. Photography M. Pieroni
▽ *Verticordia insignis*, see page 224. Photography by J. Simmons



In many cases we are going back to natural populations to select parent plants with superior qualities for cut flower production to those currently being grown. Two species for which this has already been done are *V. cooloomia* and *V. mitchelliana*. With *V. cooloomia* we believe we have identified several plants with flower heads that open evenly. With *V. mitchelliana* we believe we have identified a plant with an upright growth habit and long stems. In 1996 we will have established about 50 plants each of 8 to 10 vigorous species/varieties. In addition, four to five plants each of another 15/20 species/varieties will be selected and planted as a genetic resource. It is hoped that the Muchea site will become a stock garden for future *Verticordia* research including breeding. In our opinion the development of hybrids will be an essential part of the successful cultivation of *Verticordia* for cut flowers.

Verticordia Cultivation

Our Garden No. 24

by Judy Growns*

A sound horticultural principle is to choose those plants which will grow in the prevailing conditions of soil and climate that exist in your garden. However, our decision to grow *Verticordia* was romantic rather than practical. We had an area of 1,000 metres square that we could see from the kitchen window, and had a vision of this space covered in a blaze of *Verticordia* colour. The area was covered in weed species, was wet and cold in winter, hot, dry and hard in summer. It had little top soil, having been mined for laterite gravel by a previous owner. Now, after seven years one cannot say that this was an ideal situation but our experience did provide an interesting beginning.

With this environment we started planting in 1988. Four *Verticordia* that grow near here, *V. citrella*, *V. acerosa*, *V. huegeli* and *V. plumosa* were planted with the following, *V. acerosa*, *V. chrysanthella*, *V. nobilis*, *V. cooloomia*, *V. nitens*, *V. aurea*, *V. staminosa*, *V. insignis* all in one group; *V. helichrysantha*, *V. densiflora*, *V. brownii*, *V. eriocephala*, *V. minutiflora*, *V. monadelpha*, *V. mitchelliana*, *V. plumosa* all another group; *V. picta*, *V. blepharophylla*, *V. lindleyi*, *V. bifimbriata*, *V. etheliana* and *V. fragrans*. Of these 25% survived.

Having learned from this first planting we set out to establish a second in 1992 in what we thought could be a better position. The area was nearly weed free, still in loamy laterite, but with a fair depth of topsoil, good drainage and facing north. There was some subterranean clover but little cape weed or grass. It is sheltered by, but not overcrowded with *Eucalyptus* trees.

*I am unable to state categorically any particular fact regarding the cultivation of *Verticordia*, but would like to make some contribution to the general knowledge of growing this genus, I submit the following experiences. "Kiewa", as we call this block is 3.4 hectares within the Darling Scarp, Lat. 31, Long. 116, 280 metres above sea level and 32 km from the sea. The soil is laterite and ironstone held together loosely with loam and in some places only thinly spread over caprock. Temperatures range from 1°C in winter, up to 44°C in summer, which is long, hot and dry. Over 10 years we have had an average annual rainfall of 949 mm, falling mainly in May, June and July, with little or no rain in January and February, the two hottest months. We have a few mild frosts and often strong winds that sweep down the valley, particularly hot, drying easterlies in the summer.

We planted *V. staminosa*, *V. plumosa*, *V. brownii*, *V. minutiflora*, *V. penicillaris*, *V. monadelpha*, *V. mitchelliana* and *V. picta* as before and added *V. endlicheriana*, *V. longistylis* and some of Doug McKenzie's grafted species of *V. brownii*, *V. fastigiata*, *V. galeata*, *V. lehmannii*, *V. longistylis*, *V. mitchelliana* and *V. monadelpha*. These had been grafted on to *Darwinia citriodora* which is native to, and does well in this area.

These were connected to a 450 litre tank with trickle irrigation and watered during summer. The tank was emptied via the trickle, so that each plant received 6 litres of water once every six to eight weeks during summer, until the autumn rains began. We had 75% success with the rooted cuttings, some surviving from each of the species. Only one of Doug McKenzie's grafted species, *V. brownii* died. Three years later, in 1995, there have been no further losses.

Pests and diseases have not been a problem. We use no insecticides and have a great range of birds and spiders that keep the insects in check. Even so, the great range of chewing and sucking insects that we have seem to ignore *Verticordia*, including a plague of grasshoppers that left them undamaged. Some growers have had problems with fungus and mould but possibly the great air circulation (polite term for strong winds) helps to prevent this here.

How we plant! In our loamy laterite we have found that a large hole 300 mm deep, dug with a 200 mm auger gives the best results. This shatters the gravel and loam without creating smooth sides and the roots can penetrate easily. We plant without the addition of fertiliser, teasing out the roots, planting and watering-in. Unless it rains within two weeks the plants are watered again. Most plants have been kept in a nursery where they are watered every day and need time to adapt.

The potting mix we use to transplant rooted cuttings into pots is 1/3 unfertilised potting mix, 1/3 coarse sand and 1/3 fresh pine chips, for extra drainage. We add to this mix two tablespoons of IBDU per 30 litres, to compensate for the loss of nitrogen as the pine chips decompose. The plants are then given a small application of Formulex (a hydroponic nutrient solution) three weeks apart for three months. We had a trial using fertiliser in the third planting (May 1994). Each plant was given an application of one of four different fertilisers, blood and bone, slow release Osmocote 18:2.6:10, pelletised chicken manure or Yates Complete Fertiliser. The only obvious result was with *V. plumosa*. All four have developed an equally stronger growth, a deeper colour to the leaves and are all putting out longer and stronger new shoots than any of the non fertilised plants. Apart from this trial and when they are at the pot stage, we use no fertiliser. We plant nitrogen releasing plants such as *Kennedia prostrata* and *Acacia nervosa* amongst the *Verticordia*. These also protect the soil as a living mulch.

The question of **mulch** is still unresolved. Decomposing litter of any sort would raise the humidity and create a nice environment for fungus and mould, but gravel could protect the soil without raising the humidity level. Except for the ground cover plants, and on the second planting, a thin layer of straw to shade the soil, we have not used mulch.

Pruning is essential for some (maybe all) cultivated *Verticordia*, although the question of how and when is still unresolved. Some of our unpruned plants, especially *V. cooloomia* and *V. fragrans*, have become very woody with reduced flowering. A light pruning after flowering is a generally accepted practice and could give continued vigorous growth, better flowering and maybe a longer life.



Verticordia oculata flower, photo by R. Paynter; plant, photo by E. A. George





△ *Verticordia mitchelliana* see page 225 for description. Photograph by Neil Marriott.

▽ *Verticordia mitchelliana* and the white form of *Verticordia monadelphæ* growing along the edge of Pat Moyles driveway, see 'Verticordia Garden' on page 191.



We have yet to come to terms with summer watering and are carrying out trials. I suspect that some *Verticordia*, specially those that hibernate in summer, i.e., *V. staminosa*, *V. huegelii* and *V. insignis* (there are probably others) may need a rest period and summer watering, which prevents hibernation, may shorten their lives. The third planting does not include any of these species and we have watered this planting all summer with overhead sprinklers. The ground was thoroughly soaked every six to eight weeks. This planting is well drained, has top soil and is in a very open position. Which of these has contributed to the 95% success rate?

One group that has been particularly difficult to maintain here all belong to the subgenus *Eperephes* sect *Pennuligera*. However, *V. chrysostachys*, *V. dichroma*, *V. muelleriana*, *V. oculata* and *V. etheliana* have all survived in an area with the best drainage and sheltered by tall shrubbery to the south, *Chamelaucium* to the west, and in association with six plants of *Acacia nervosa* which have grown to a height a little above the *Verticordia*. The ground is partially covered with *Kennedia prostrata*. The *Verticordia* are in a pocket that gets full morning sun and filtered afternoon sun. The frost and the cold wind damage have been reduced, although *V. oculata* is still regularly pruned by both the cold and frost. ■

Verticordia — The Species H. M. Hewett* ASGAP Verticordia Study Group

Similar species may be grouped, the section names of botanical literature being adopted. The first species of each group is described.†

1. Section Chrysoma. Chrysoma refers to the yellow flower colour. To the casual observer most of these smallish, rounded shrubs with myriads of flowers virtually concealing the foliage, may appear almost identical. As the individual flowers of most age the colour changes from yellow to red, although with some this colour change is less pronounced than with others. All species in this section have bracteoles that fall as the flower opens and a ribbed, turbinate, (tcp-shaped) hypanthium.

Verticordia acerosa is a small shrub rarely exceeding 80 cm in height. Sepal lobes are openly-fringed, the petals deeply lobed and the stamens alternately long and short, the anthers with a short obtuse appendage. The fringed or dentate flat staminodes have an obscure midrib, at least in the lower half. The type variety has fringed staminodes, and the variety *preissii* has dentate staminodes and furthermore, is very variable in leaf form.

***Editors note.** At my request Max Hewett prepared the above article based upon the scientific publication reviewing the genus *Verticordia* by Alex George in *Nuytsia* 7(3) 1991 and with Elizabeth George in 9(3) 1994.

Verticordia is a large group of very beautiful plants, just browse through the beautiful colour pictures in this issue. There is a botanical key to the species of *Verticordia* published in the correct manner in a scientific journal. It is completely incomprehensible to me.

† ***Verticordia*** can be divided into groups of very similar plants and this article describes one species in each group and how the other very similar species vary from the one described. The order chosen reflects the similarity with the first species. The scheme is that you do not need to be familiar with botanical terms, just check the sketches against the plant. A certain minimum number of terms is essential and these are given in the article "The Flower".

If all this is too hard for you I have attempted to produce at least one colour photograph of the described species in each group. You may then try your hand at identification using pretty pictures. Can I get it any simpler?

Verticordia citreila, a small shrub to 70 cm high, is similar to *V. acerosa* but with smaller floral leaves elliptic to orbicular 2–3 mm long, and smaller flowers, with petals 1.5–1.8 mm long and digitate. The sepals are reflexed around the hypanthium and the lobes are fringed rather than plumose.

Verticordia subulata, a small shrub to 70 cm high, is similar to *V. acerosa* differing in having flowers with more densely fringed sepals, terete needle-like staminodes and a short style. The floral leaves are usually very broad. The flowers have no scent, unlike those of *V. acerosa* and *V. endlicheriana*.

Verticordia endlicheriana is similar to *V. acerosa*, but the hypanthium is broader at the base and the staminodes are entire, oblong and obtuse. The type form is an irregular, somewhat corymb (cauliflower-like) shrub to 1 m high. The lower leaves are semi-terete and linear; the floral leaves orbicular to ovate.

The variety *compacta* is a small, rounded compact shrub with dense groups of flowers.

The variety *manicula* has smaller petals, the name referring to the hand-like appearance.

The variety *major* has the largest flowers of the species.

The variety *angustifolia* is a many-branched shrub with longer and narrower leaves.

2. Section Jugata. The name alludes to the united, persistent bracteoles which form a collar around the 10-ribbed, warty, roughly hemispherical hypanthium.

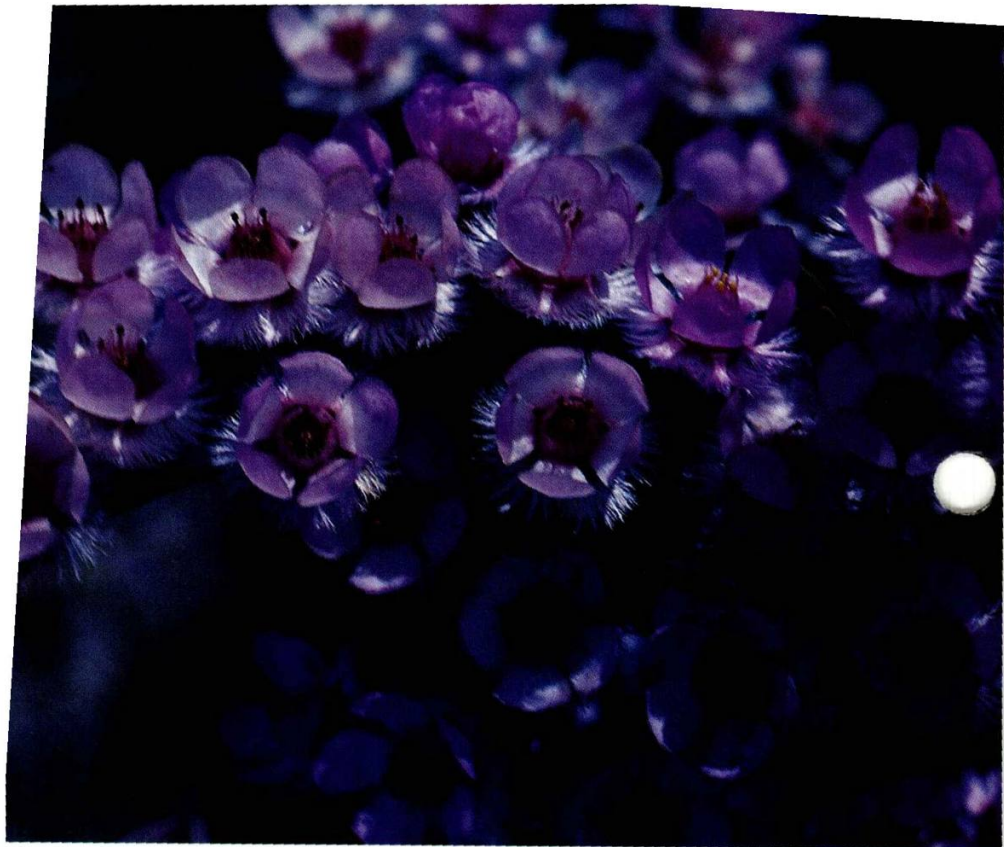
Verticordia chrysantha is a small shrub rarely exceeding 80 cm and upright in habit. The species is variable but two forms are noted, separated primarily by the staminodes which are either entire for one form or lobed for the other. Neither form is lignotuberous. The lower leaves are linear and semiterete and the upper ones linear, oblong or narrowly lanceolate and semiterete or concave. Sepals and petals are similar for each form. The petals are digitately lobed and the lobes of the sepals are densely fringed. The flowers are formed in corymb-like groups.

Verticordia chrysanthella, a small shrub to about 1.5 m high, similar to *V. chrysantha* differing in having a lignotuber, smaller leaves and flowers and is multi-stemmed. It is variable but two forms are noted separated primarily by the staminodes which are either entire for one form or lobed for the other. This species has previously been known incorrectly as *V. chrysantha* var. *preissii*. The above species are featured in the scene and garden photographs on pages 192 and 209.

Verticordia gaieata, a small shrub to 1 m high, is similar to *V. chrysantha* but is easily distinguished by the large inflated anther appendage (from which it derives its name) and the longer peduncles (12–20 mm). The leaves also are generally longer and the acute narrowly triangular staminodes are distinctive.

Verticordia brevifolia, a small shrub to 70 cm high, is similar to *V. chrysantha* differing in having a lignotuber and leaves which are short and thick. The type variety has sepals and petals 3–3.5 mm long, whereas the subspecies *stirlingensis* has sepals and petals 4.5 mm long. The photograph on page 209 features this plant.

Verticordia coronata, a small shrub to 40 cm high, is similar to *V. chrysantha* but differs in having a small lignotuber. The prominent staminodes are broad and entire forming a crown-like centre to the flower. The floral leaves are elliptic-oblong, thick and entire and the hypanthium is warty.



Verticordia picta, see page 225. Photography Δ by Ilma Dunn ∇ by N. Marriott





Verticordia nobilis, see page 218. Photography by Ilma Dunn



Verticordia amphigia, a small shrub to 1 m high, is similar to *V. chrysantha* but has more slender leaves, broadly boat-shaped fimbriate bracteoles and smaller flowers with small anthers and narrowly triangular staminodes. The name refers to the pair of boat-shaped bracteoles which are pointed at both ends.

Verticordia laciniata, a shrub to 1 m high, is similar to *V. chrysantha* but is easily distinguished by the channelled, shortly ciliate (hairy-edged) leaves, the longer stamens, the larger folded anther appendage and the subulate laciniate (long hairs) staminodes to which its name refers.

3. Section Unguiculata. The name refers to the double-clawed anther appendage, a conspicuous distinguishing feature of this group. The bracteoles are persistent and the stamens alternately long and short.

Verticordia grandiflora is a shrub to 70 cm high. The leaves are semiterete, the lower ones linear and the upper ones linear or oblong. The yellow flowers, in corymb-like groups, age to red. The bracteoles are united. The hypanthium is broadly hemispherical, obscurely 10-ribbed and warty. The sepal lobes are densely fringed and the petals digitately lobed. The stamens are erect or inflexed and the staminodes lanceolate or triangular, lobed or fringed. The species grows to the east and south-east of Perth.

Verticordia nobilis to 1 m tall, is similar to *V. grandiflora* but the flowers are larger and are on longer peduncles; the erect stamens are longer and it also has a longer exerted style. The upper leaves, 8–12 mm long, are also longer and usually are not on short lateral branchlets. The species grows north of Perth. See photograph on page 217.

Verticordia rutilastra to 70 cm tall, is similar to *V. grandiflora*, differing in having smaller flowers with shorter stamens and staminodes and a very short style. The staminodes are fringed and have more cilia than the other species in this section. The petals turn red as the flower ages giving a star-like appearance.

4. Section Sigalantha. The name refers to the glossy or shining petals of the yellow flowers. The hypanthium is flattened-hemispherical and the staminodes are broadly oblong and entire.

Verticordia serrata has flowers in corymb-like groups carried on erect stems. The petals are dentate or entire; the stamens erect. The type variety is a small, variable, erect shrub to 1 m high. The stem and floral leaves are generally obovate and up to 3 mm long, edged with hairs to 0.3 mm long. Petals are up to 3 mm long and 1.5 mm wide with teeth to 1 mm long. The leaves and flowers are generally smaller than for the other two varieties. See photo on page 189.

V. serrata var. *linearis* has linear leaves 6–12 mm long with short marginal cilia often only in the lower half.

V. serrata var. *ciliata* has more prominent leaf hairs up to 2 mm long.

Verticordia integra, a small shrub to 70 cm high, is similar to *V. serrata*. The oblong to obovate leaves are thick and entire and the entire petals 3–3.5 mm diameter, are orbicular and larger. The hypanthium furthermore is less warty.

5. Section Chrysorrhoe, a group with orange and yellow flowers and long, semiterete leaves, broadly turbinate hypanthium and narrowly triangular staminodes.

Verticordia nitens to 1.5 m high, has bright orange flowers in large cauliflower-like heads carried on tall erect stems. The petals are 3 mm long. The 4 mm long sepals have a few reflexed hairs but are without auricles.

Verticordia aurea, a shrub to 1 m high, is similar to *V. nitens* but the individual flowers are larger with petals to 4.5 mm long and the leaves are thicker. The flowers are a golden yellow, occurring in November and December.

Verticordia patens, a shrub to 1 m high is similar to *V. nitens* but has a more openly branched habit. The flowers are lemon yellow and the sepals, to 3 mm long, have prominent auricles. The smaller petals are 2 mm long.

6. Section Cooloomia. A unique species found only in and near Cooloomia, WA.

Verticordia cooloomia is a tall shrub which can exceed 2 metres in height. The striking golden yellow flowers are formed in corymb-like groups but perhaps a most unusual characteristic, unique among the genus, is the variable foliage. Three distinct leaf forms are carried simultaneously, representing different stages of plant development. Lowest leaves are linear, semiterete and crowded; stem leaves narrowly lanceolate and concave and floral leaves orbicular and concave. Also unusual among the *Verticordia* genus is the form of the sepal apices which are dentate and virtually concealed by the large 4 mm diameter orbicular petals. The hypanthium is broadly turbinate, obscurely 10-ribbed and glabrous. The flowers have a strong unusual perfume. See the photograph on page 233.

7. Section Synandra. The name refers to the united stamens and staminodes. The hypanthium is turbinate, 10-ribbed and warty and the sepals lobes fringed.

Verticordia staminosa, has greenish yellow flowers aging to red and with deep-green, linear, terete, crowded leaves. The type form has staminodes inserted on the outside of the staminal tube and is a low-growing, spreading shrub with flowers pendant below the low arching branches. See photograph on page 233.

V. staminosa subsp. *cylindracea* has the staminodes inserted between the staminal filaments with a similar low growth to the type form *V. staminosa* var. *erecta*, is a shrub to 70 cm tall with erect pine-like stems and smaller flowers.

8. Section Verticordia. This section includes *V. plumosa*, the first *Verticordia* species so named, presumably in reference to the goddess Venus as "the turner of hearts" The sepal lobes are plumose and the hypanthium turbinate and hairy.

Verticordia plumosa is a bushy shrub which may attain a height of 80 cm. The grey-green, slightly glaucous leaves are semiterete and linear. The small pink flowers, with sepals 2.5–4 mm long on peduncles 3–7 mm long form dense corymb-like groups. The sepals are without auricles, and the style, which is not (or shortly) exerted, has a short but readily evident beard. The staminodes are entire. It is the most variable species in the genus.

V. plumosa var. *ananeotes*, a tufted shrub to 40 cm having a small lignotuber. The non-glaucous leaves are sparse on the main stems but crowded on small side branchlets.

V. plumosa var. *vassensis* is a shrub to one metre with several erect to spreading, open main branches. It does not have a lignotuber.



△ *Verticordia eriocephala*, see page 222
Photography by N. Marriott

▽ *Verticordia polytricha*, see page 222
Photography by E. A. George



V. plumosa var. *pleiobotrya* is similar to *V. plumosa* var. *vassensis* but is a smaller shrub with smaller flowers in many small groups. The leaves are greyish.

V. plumosa var. *brachyphylla* is an openly-branched shrub to approx. 70 cm with short leaves to 7 mm long. Peduncles are 7–11 mm long and somewhat thickened.

V. plumosa var. *incrassata* is a shrub to 80 cm with several irregular, spreading stems. The leaves are crowded and thickened towards the tip.

V. plumosa var. *grandiflora* is a shrub to 1.3 metres tall with one or several erect stems. The leaves are medium-green and the flowers are formed in rounded terminal groups. Unlike other varieties the flowers are white or pale-pink and are also larger.

Verticordia sieberi is similar to *V. plumosa* but the sepal lobes are narrower and have a deeper fringing. The petals are orbicular and the flower colour pale to mid-pink. It also flowers later commencing from mid-summer. The typical form has sepals to 3 mm long and entire to erose petals.

V. sieberi var. *curta* has shorter sepals and erose to shortly serrate petals.

V. sieberi var. *lomata* has fringed petals and slender leaves less than 1 mm wide.

V. sieberi var. *pachyphylla* has fringed petals, the thicker leaves are broader, to 2 mm.

Verticordia stenopetala, a small shrub to 50 cm high, is similar to *V. plumosa* but the petals are ovate, the style is longer, to 7 mm, and the flowers deep pink.

Verticordia helichrysantha, a bushy shrub to 30 cm high, similar to *V. plumosa* but has pale yellow flowers to about 10 mm diameter. The long exserted style, to 22 mm, has an inconspicuous beard and the staminodes are entire. The petals are pubescent and the leaves, to 6 mm long are club-shaped and obtuse.

Verticordia crebra, a bushy shrub to 35 cm high is similar to *V. helichrysantha* but has longer, more slender leaves to 14 mm long. These are very crowded on the stems and have long petioles to 2.5 mm. The pale yellow flowers, with protruding styles similar to the above are, however, much smaller. The petals are orbicular and glabrous with smaller but broader, less glandular staminodes.

Verticordia pityrhaps, a dense pine-like shrub to 60 cm high, derives its name from its habit; [from the Greek *pitys* (a pine) and *rhaps* (a shrub)]. The crowded leaves are 7–14 mm long. The crowded flowers are small with a 5 mm exserted style and have fringed staminodes. The flower colour is pink.

Verticordia harveyi is similar to *V. pityrhaps* but is an open shrub to 70 cm high, with widely spaced corymb-like groups of small pink flowers.

Verticordia fimbrilepis, a small shrub to 60 cm high varies from the other species in this section in having a short style that does not protrude above the stamens. The type variety has flowers with peduncles 2–4 mm long and a long apical hair to the staminodes. The subspecies *australis* has peduncles 5–15 mm long and staminodes fringed on the margins but without a long apical point.

9. Section Corymbiformis. Flowers in this section are small and formed in terminal corymbiform (cauliflower-like) groups as shown in the photograph on page 220.

Verticordia eriocephala, an erect shrub to 1.5 m in height is widespread in the inland heath areas of south-western Western Australia. The hypanthium which is constricted at about the middle, is wider in the lower half and has a ring of basal hairs. The flowers are white or cream with glabrous petals and a glabrous exerted style to 4 mm long. This species is often colloquially referred to as "Cauliflower" and for many years has been known as *V. brownii*. Photograph on page 220.

Verticordia brownii, a shrub to approximately 80 cm is similar to *V. eriocephala* but has pale pink, rather than white flowers, shorter basal hairs to the hypanthium and a longer style (to 6 mm), which is bearded below the apex.

Verticordia capillaris, a shrub to 1.3 m high is similar to *V. eriocephala* but has longer semi-terete leaves, the hypanthium is more densely hirsute towards the base and the petals are more densely pubescent outside. It also tends to be flatter topped in flower. The very slender glabrous style is purple towards the apex and the flowers tend to be whiter than those of *V. eriocephala*.

Verticordia polytricha, to approximately 1.8 m is a more bushy shrub and less erect in habit than *V. eriocephala*. The hypanthium is not constricted. The leaves are linear and semi-terete and the style is kinked and has a short, one-sided beard just below the apex. The flowers are cream-white. Photograph on page 220.

Verticordia densiflora is extremely widespread and variable. As with *V. polytricha* the hypanthium is not constricted. The sepals appear prominently clawed and the style is curved towards the apex and has a surrounding beard. Flowers are generally pink, except for one pale yellow variety. This is a variable species the type variety having narrow floral leaves. The longest peduncles are 1.5–4 mm long and the flower groups are corymb-like.

V. densiflora var. *roseostella*, is openly-branched to 1.3 m tall with pink flowers.

V. densiflora var. *cespitosa*, with several stems to 70 cm tall may sometimes have a fire-resistant rootstock. The flowers are in corymb-like groups.

V. densiflora var. *pedunculata*, to 60 cm tall has longer peduncles and larger flowers.

V. densiflora var. *stelluligera*, openly-branched to 2 m, with yellow or cream flowers.

10. Section Micrantha. The name refers to the small flower size which includes the smallest in the genus. The hypanthium is narrowly 5-ribbed, turbinate and pilose.

Verticordia minutiflora is a bushy shrub to 50 cm (to 1 m). The minute white to pale pink flowers with sepals to 2.5 mm are formed profusely in corymbiform heads. The staminodes are minute or sometimes absent and the style is exerted and bearded. The species is usually found on granitic slopes.

Verticordia vicinella is similar to *V. minutiflora* but rarely exceeds 50 cm in height. The flowers are usually pink or lilac with larger stamens and staminodes and more numerous sepal divisions. The flowering time is also later than the above species, frequently extending well into autumn. The habitat also varies being sandy, often low-lying and close to water.

Verticordia fastigiata is similar to *V. minutiflora* but has a very different growth habit resembling a bonsai specimen. It is a small, very compact shrub rarely exceeding 30 cm high. As it ages it divides from the rootstock into multiple thick stems having a somewhat gnarled appearance. The flowers may vary from deep red to deep yellow, have glabrous and shining petals and a strong mouse-like odour. The staminodes are as long as, or exceed, the stamens, and the bracteoles fall off soon after the flowers open.

11. Section Infuscata. The name alludes to the rather dull appearance these plants present. The hemispherical hypanthium with long hairs around the base, is without ribs but has 5 swellings towards the apex. The long exserted styles are a distinctive feature.

Verticordia oxylepis is a low spreading shrub with horizontal branches and small grey-green leaves. Except for the erect 6–7 mm long styles the small dull-yellowish flowers, with petals to 2 mm long, although borne in profusion on top of the foliage are relatively inconspicuous.

Verticordia longistylis, although related to *V. oxylepis* is much larger in all characters. It is an irregular shrub to 70 cm with a rather sprawling habit. The leaves, to 10 mm long are crowded and present a somewhat conifer-like appearance. They are bluish-grey when mature and the new tip-growth is purple-glaucous. The flowers, with very long styles (27–32 mm), are scattered over the plant rather than produced in profusion. The small concave petals are creamish and the yellow and purple much-divided sepals are not readily seen.

12. Section Elachoschista. The name refers to the small, almost entire, sepals.

Verticordia verticordina, a shrub to 20 cm high, has some characters such as habit, leaves and hypanthium similar to species in Section Infuscata above. The flowers are cream turning greenish-brown in colour but are without the distinctive sepal lobes usually associated with *Verticordia*. The staminodes are prominent, exceeding the stamens and the species has a long style. The species bears some resemblance to *Darwinia* and *Chamelaucium* species. Photograph on page 232.

13. Section Penicillaris. This group of species have, an un-ribbed, hemispherical hypanthium, with a ring of hairs at the base. The style is exserted, and prominently pilose. The staminodes are entire, the intricately divided sepals without clawed auricles.

Verticordia penicillaris is a low spreading shrub with cream-yellow flowers 13–15 mm diameter with sepal lobes divaricately divided and a distinctive long erect style (15–19 mm) with prominent purple hairs in the upper third. Photo, page 236.

Verticordia dasystylis is similar to *V. penicillaris* but is distinguished by the smaller habit and flowers; the shorter style (7–9 mm) with white hairs for 2/3 to 3/4 its length and the sepals with fringed lobes. The type form is a multiple-stemmed shrub to 40 cm with staminodes to 2 mm long.

V. dasystylis subsp. *oestopoia* has very short staminodes 0.7 mm long.

V. dasystylis subsp. *kalbarriensis* has long staminodes to 2.5 mm long.

14. Section Pilocosta. The name refers to the ribs of the hypanthium which are hirsute. The 10 ribs and the hypanthium is turbinate and with a ring of hairs at the base. The sepals which are without auricles are intricately and divaricately divided.

Verticordia huegelii, with flowers approx. 14–15 mm in diameter is a variable species. The style is thick and pilose with a broadly capped stigma. The flowers have fringed or lobed staminodes and the fringed petals are approximately orbicular. The type form is an erect shrub to about 80 cm with creamy-white flowers ageing to maroon during September and October.

V. huegelii var. *stylosa* is similar but has yellow flowers opening a little later.

V. huegelii var. *decumbens*, a low spreading shrub approx 10 cm high and 30 cm wide has flowers opening cream and ageing to pink.

V. huegelii var. *tridens* has distinctive tridentate staminodes and yellow flowers ageing to red.

Verticordia brachypoda, a small shrub to 70 cm high is similar to *V. huegelii* but the stigma is not, or is only slightly enlarged. The sepals and petals are usually cream with pink suffusion but white and red forms have been noted. Although the pink may intensify a little with age there is not the complete colour change as noted for *V. huegelii*.

Verticordia multiflora is a small shrub to 50 cm high with spreading, rather straggling stems. It is similar to *V. huegelii* but has bright yellow flowers with entire, subulate staminodes and the stigma is only slightly enlarged. The type form has hirsute ribs to the hypanthium and the sepals are deeply fringed. The flowers do not redden with age.

V. multiflora subsp. *solox* has larger flowers, divisions of the sepals are coarser.

15. Section Catocalypta. Species in this section have a 10-ribbed turbinate hypanthium. The sepals are deeply lobed, fringed, with auricles at their base reflexed against the hypanthium, and their apices are densely fringed and upturned. The leaves are three-sided.

Verticordia insignis is a small shrub to 70 cm with stems ascending or widely spreading. The leaves are linear and obtuse, the upper ones being 3–9 mm long. The peduncles are usually 12–25 mm long. The apices of the upturned sepal lobes form a silky-hairy ring around the hypanthium. The staminodes are red and have silky hairs on the inner face and the sepals are usually white with petals to 4 mm long. The glabrous style is 5–6 mm long. See photograph on page 209.

V. insignis subsp. *eomagis* generally has larger flowers with pale staminodes and concave petals to 5 mm long.

V. insignis subsp. *compta* is an erect or straggly shrub to 1 metre tall. The style is short, 2.5–3.5 mm, and the sepals and petals are bright pink.

Verticordia roei, a small corymbose shrub similar to *V. insignis* but the staminodes are more or less acute and either entire or obscurely lobed. The type form has creamy white flowers with stamens to 3.8 mm long and style to 3 mm long. *V. roei* subspecies *meiogona* has obtuse staminodes, shorter stamens and style and sometimes has pink flowers.

Verticordia inclusa is similar to *V. insignis* but differs in the stamens and style which are short and enclosed within the petals. The staminodes are fringed only on the margins and glabrous on the inner face. The generally cream flowers and the leaves are usually smaller than the above species.

Verticordia apecta is similar to *V. inclusa* but it is more spindly in habit. The style has a ring of short hairs below the stigma and the sepals and petals are deep pink. The sepals and their auricles are more sparsely fringed, the petals more deeply fringed and the staminodes less so.

Verticordia habrantha is a small variable shrub, sometimes with a small lignotuber, several erect stems and flowers with petals to 5 mm long. Others, without a lignotuber, are widely branched from a single basal stem with smaller flowers. Flower colour varies from pale pink to almost white. The large, entire or erose petals are the dominant flower feature, almost concealing the sepal lobes.

Verticordia pritzelii is a small compact shrub to 30 cm high and 60 cm wide. It has a style with a lateral beard below the stigma. The petals are shortly fringed about most of the margin and the sepal auricle divisions are slender and divaricate. The deep pink flowers to 8 mm diameter.

Verticordia lehmannii, a small erect shrub to 60 cm high, is similar to *V. pritzelii* but the petals have a long fringe on the upper margins and the lateral margins are entire. The petal lamina is glabrous and shining and the sepal auricles have flat lobes that are densely fringed.

16. Section Platandra. The name refers to the compressed anthers. The hypanthium is broadly turbinate, silky-hairy towards the base and on the ribs.

Verticordia gracilis a shrub to 30 cm with deep pink flowers resembles *V. pritzelii* having similar habit, leaves and style. It is more slender however and differs in not having reflexed lobes to the sepals, which are without auricles and are more finely divided.

17. Section Recondita. The name refers to the small plant size, the pendulous flowers and closed petals covering the stamens.

Verticordia humilis is a small spreading shrub to 30 cm high and 30 cm wide with red pendulous flowers. Petals are without translucent margins, the anthers out-turned and the hypanthium turbinate, constricted and with long silky hairs but not with a ring of hairs at base. The sepals are without auricles, the style exerted with a small beard and the leaves are linear and three-sided. See photograph on page 232.

18. Section Intricata. The name refers to the intricate sepals, the lobes of which are divaricately and finely divided and have reflexed, divaricately divided auricles. The 10-ribbed turbinate hypanthium is expanded towards the apex and with a ring of hairs at the base. The leaves are semi-terete.

Verticordia monadelpha is quite variable in habit, size and floral parts. The style is shorter or slightly longer than the petals of the flowers, to 12 mm diameter, formed in corymb-like groups, are generally in shades of pink, although white forms have been recorded. The type form is a somewhat openly branched shrub to 1.5 m.

V. monadelpha var. *callitricha* is usually a rounded and dense shrub to 70 cm although occasional specimens may greatly exceed this. It has slightly shorter petals and longer stamens which are shortly exerted. The flowers are usually a deeper pink.

Verticordia mitchelliana is readily distinguished by the long-exserted style, (24–27 mm long) and the large pendant, bright red flowers. The bluish-green leaves and the branches are warty. A bushy shrub up to 1 m high, with forms with less stature and more spreading foliage development are found. See photo, page 213.

Verticordia pulchella, a small shrub to 40 cm with spreading or arching branchlets is similar to *V. mitchelliana* but is smaller in all respects except the length of the stamens and staminodes. Both branchlets and leaves are somewhat warty. The leaves are 2–7 mm long. The flowers are red with peduncles 7–9 mm long and the exerted style is 13–15 mm long. See photograph on page 192.

19. Section Integripetala. The name refers to the petals which are almost or completely entire. The hypanthium is hemispherical, 10-ribbed and has small globular appendages between the ribs below the middle. The style is shortly bearded just below the stigma.

Verticordia picta is a bushy shrub of varying habit to 1.5 m but rarely exceeding 80 cm in height. The flowers, 10–12 mm diameter are pink but variable in colour intensity and may darken with age. The sepal divisions are fringed and there are 5 fertile stamens. The acute to obtuse style hairs are not gland-tipped. The large, entire, almost orbicular petals which virtually conceal the sepal lobes are the dominant feature of the flowers formed in terminal corymb-like groups. Photo, page 216.

Verticordia rennieana is similar to *V. picta* but differs in having a prominent flange on the hypanthium descending from the apex and almost obscuring the body. The leaves are prominently warty, the style hairs are gland-tipped and the flowers are briefly pink before ageing to white.

Verticordia interioris, a bushy shrub to 70 cm high, is similar to *V. picta*, but has 10 fertile stamens and warty leaves. The flowers are deep pink, the ovate-tipped, elliptic petals narrowed to a basal claw. The style, 3–4 mm long is bearded below the apex with forked hairs.

Verticordia helmsii, a shrub to 70 cm high is similar to *V. interioris* but has white to pale pink flowers with petals not clawed, the leaves are prominently glandular.

20. Section Tropica. The name refers to the tropical distribution of species in this section. All are tall shrubs or small trees. The bracteoles fall off soon after the flowers open and the hypanthium is hemispherical, 5-ribbed and without appendages from the apex.

Verticordia cunninghamii can grow to 7 m tall. It has opposite leaves, 7–23 mm long rather openly arranged and with prominent oil glands. They are linear and entire and are strongly aromatic when crushed. The flowers, to approximately 12 mm diameter, are white with straight styles 5–7 mm long. The shortly auriculate sepals, 5–7 mm long, are divided into irregular, fringed lobes.

Verticordia verticiliata is similar to *V. cunninghamii* but leaves are in whorls of 3 or 4, without prominent oil glands and are not aromatic when crushed. The style 9–13 mm long. This is a shrub or small tree to 6 m tall.

Verticordia decussata an open shrub with small creamish-white flowers. It has very short, 2–3 mm, leaves closely crowded on lateral branchlets. The sepals are 4–5 mm long. It grows to 2 m tall.

21. Section Jamiesoniana.

Verticordia jamiesonii is a shrub to 60 cm high. The 10-ribbed hypanthium is broadly-turbinate, shining and without reflexed appendages. The stamens and staminodes have long silky hairs. The sepals, with fringed lobes, are without auricles or reflexed lobes. The style is straight, thick and hirsute towards the base.

22. Section Verticordella. The suffix (-*ella*) refers to the small size of the flowers which are formed in terminal spike-like groups. Most are pink, the sepals with fringed lobes. The hypanthium is turbinate with green reflexed appendages at the top. The bracteoles fall off soon after the flowers open, the stamens and staminodes glabrous and the style bearded below the apex.

Verticordia drummondii is a rather erect shrub to 1 m high. The pink flowers, to 8 mm diameter, are carried during March and April in compact, erect, terminal spike-like groups. The 4 mm long fringed petals have simple fringe hairs more than 1 mm long across the broad apex and the style is 6–8 mm long. The reflexed appendages to the hypanthium are acute and the small leaves are appressed (close to the stem).

Verticordia wonganensis, a small shrub to 70 cm high is similar to *V. drummondii* but has larger, paler-pink flowers opening earlier (November–December). The petals are 5–6 mm long and the shorter style is 5–6 mm long.

Verticordia attenuata, a small shrub to 80 cm high is similar to *V. drummondii* but unlike all other species in this section, the petals are markedly narrowed towards their fewer-haired apex and the style is thicker.

Verticordia tumida, a small bushy shrub to 70 cm high, differs from other species in this section in having a broader, rounded-ribbed hypanthium with swollen reflexed appendages. The bright pink flowers are larger than for *V. drummondii* and have a short style to 4 mm long. Flower groups are small. The leaves, to 3 mm long are grey-green and spreading. The type form has a prominently angular hypanthium constricted towards the base; 9 or 10 sepal lobes with few reflexed hairs and a coarse petal fringe with segments serrate towards the base.

V. tumida subsp. *therogana* has an obscurely ribbed hypanthium not constricted towards the base, fewer sepal lobes with numerous reflexed hairs and the petal fringe not or sparsely serrate.

Verticordia bifimbriata is a shrub to 70 cm high, the pink flowers relatively larger than most others in this section. The petals, to 6.5 mm long, have a fringe to 3 mm long and the fringe segments are themselves fringed. The reflexed appendages to the hypanthium are thick and have an acute apex which is free from the hypanthium. The sepals are 5–6 mm long with 6 or 7 auriculate lobes.

Verticordia paludosa, a small shrub to more than 1 m high, similar to *V. bifimbriata* but with reflexed appendages merging into the hypanthium, the 4 mm long sepals are without auricles and the bracteoles are hairy. The flowers are pale pink with petals 5 mm long.

Verticordia luteola, a small, openly-growing shrub to 1 m high is similar to *V. bifimbriata* but the sepal lobes are more numerous (7–9); are without auricles, and have very few reflexed hairs. The reflexed appendages to the hypanthium are more swollen and the stamens and staminodes are shorter. The type form is unusual in this section in having pale yellow flowers. The reflexed appendages to the hypanthium merge into same. The variety *rosea* has bright pink petals with a silver fringe and the reflexed appendages to the hypanthium are more distinct.

Verticordia auriculata, a small much-branched shrub generally to 50 cm tall has prominent silvery auricles to the sepals. The hypanthium is ribbed. The flowers are small like *V. drummondii* and are frequently a striking deep purplish pink in colour, formed in small groups. The 5 mm long petals have fringed hairs to 1.8 mm long. The small leaves are close to the stem.

Verticordia mitodes is a small much-branched, rounded shrub to 50 cm high and similar to *V. auriculata*. The basal auricles to the sepals are slender, the hypanthium is ribbed and the small 1–2 mm long leaves are spreading and grey-green. The 4–5 mm long petals are distinctive in this section in having apical fimbriae to 3 mm long and no lateral fringe. The flowers are generally pale to deep purplish pink.

Verticordia centipeda is a small openly-branched shrub generally to about 50 cm high. Closely related to *V. auriculata* but the sepal auricles are much less developed and the hypanthium is shorter, pitted and obscurely-ribbed. The small, pale-pink flowers are in small groups. The small leaves are close to the stem and have prominently hairy margins.

Verticordia pholidophylla, a rather erect-growing small shrub to 70 cm high, is similar to *V. centipeda*. It is unique in this section however in the flower colour which may be from cream to very pale-pink. The peduncles are shorter than for the above species and the leaves are openly-ciliate rather than densely so.

Verticordia spicata is a small bushy shrub. The hypanthium is honeycombed and obscurely ribbed, having reflexed appendages almost as long as itself. The small, almost-sessile, pink flowers are formed in long, compact spike-like groups. The sepals have slender basal auricles; the petals an uneven fringe to 2 mm long and

the 4–9 mm long style is slender, straight and exerted. It is variable in size and flower colour. The leaves, 2–3.5 mm long, are closely imbricate, ovate-elliptic and have prominent oil glands. The subspecies *squamosa* has smaller leaves and flowers. The leaves are roughly toothed with short hairs on the margins. See photograph on page 236.

Verticordia pennigera, a small bushy shrub to about 60 cm high, varies from the above species in this section in having prominent, dentate petals; the teeth usually less than 1 mm long. The flowers are pink, varying in colour intensity, borne on peduncles 1.5–3 mm long. The leaves are spreading. Stem and floral leaves are similar but leaf size is variable. Photograph in the garden on page 193.

Verticordia halophila is similar to *V. pennigera* but has a more bushy habit. The flowers are pale-pink, with sepals grading to dark red on the lamina and are borne on shorter peduncles. The staminodes are also shorter and the style longer, to 6 mm. The species name relates to its habitat (sub-saline flats).

Verticordia blepharophylla, a small shrub to 1 m high similar to *V. pennigera* but with elliptic to almost orbicular leaves with hairs to 1 mm long. The flowers are pink without sepal auricles and with ovate petals with long slender marginal hairs. The hypanthium, with large appendages to 1 mm long, is prominently ribbed and slightly warty. The species is not lignotuberosus.

Verticordia lindleyi is a small, bushy shrub. The ribbed hypanthium has short, rounded, reflexed appendages. The leaves are shortly hairy and the peduncles 2–4 mm long. The 3–4.5 mm long petals are entire to shortly dentate and the style, 3–4 mm long, is prominently s-shaped below the apex. There is variation, in the leaves from appressed to loosely spreading and also in the flower size and petal apex. The type form, with pale pink flowers, has entire to shortly dentate petals somewhat narrowed towards the apex and staminodes shorter than the stamens.

V. lindleyi subsp. *purpurea*, with flowers varying from deep pink to purple, has coarsely-serrate petals which are broad at the apex and staminodes longer than the stamens.

Verticordia hughanii is a small, rounded, multi-branched, compact shrub to approximately 20 cm high. The leaves are grey-green and the small flowers, to 8 mm diameter, are bright red with a style 10–12 mm long. The style beard is of simple hairs, the petals are dentate. See photograph on page 229.

Verticordia carinata is an open shrub to 1 metre with arching branches and magenta-pink flowers on peduncles 5–7.5 mm long, spreading to pendulous, in long raceme-like groups. The hypanthium is broadly turbinate, ribbed and slightly warty, the reflexed appendages rounded. The fringed sepals are without auricles but have a few reflexed hairs. The flowers are unique in the genus in being somewhat zygomorphic before pollination with the two lower petals keel-like, as for a pea flower, while the other three are spread normally. The stamens and style are also irregular at this stage but after pollination the whole flower appears regular.

23. Section Corynatoca. The name refers to the distinctive club-shaped staminodes.

Verticordia ovalifolia is an erect-growing shrub to 80 cm high. The hypanthium is turbinate, obscurely 5-ribbed and has very short, broad appendages. The leaves are elliptic to obovate and have translucent, entire margins. The flowers, 12–18 mm diameter are large for the genus, carried in terminal groups. They open creamish but the petals acquire increasing pink suffusion from the base with ageing. The sepals with orbicular auricles, have plumose lobes and the petals, without auricles, are erect and oblong-cuneate with laciniate apex. Photograph on page 208.



△ *Verticordia hughanii* see opposite
Photography by E. A. George

▽ *Verticordia etheliana* see page 230
Photography by David Hockings



24. Section Pennuligera. Many species in this section are large openly-branched shrubs and carry some of the most striking flowers of the genus, in many cases against a foliage background of large, rounded mid-green leaves. The flowers are formed in spike-like or raceme-like groups and have persistent, pointed bracteoles. The hypanthium is turbinate, 5-ribbed and glabrous and has 5 reflexed appendages. The sepals, with plumose lobes, have auricles virtually covering the hypanthium and the petals have small, basal, fringed auricles.

Verticordia grandis, of variable habit, is an openly-branched rigid shrub which may reach a height of 2 m. The flowers are large, 20 mm diameter, bright red, with a conspicuous style 20–25 mm long. The staminodes are linear-subulate and entire and the petals dentate. The large rounded leaves vary in size up to approx. 16 mm wide and the lush, new terminal growth is brighter green with an almost "lettuce-like" appearance. The root system is lignotuberous. Photograph on page 196.

Verticordia oculata is a bushy shrub more or less hemispherical in habit to a height of 70 cm although lower and more spreading specimens have been noted. The leaves are almost identical in appearance with those of *V. grandis*, as also are the staminodes. The flowers, the largest in the genus to a diameter of 20–24 mm, have digitately-lobed, purple petals and the sepals are purplish with silvery lobes. The style is 10–19 mm long. Photograph on page 212.

Verticordia etheliana is a small openly-branched shrub with staminodes similar to *V. grandis*, considerably smaller, rounded leaves and large flowers with petals grading to cream at base and ageing to similar bright red. The type variety grows to 1.5 metres high, has leaves to 5 mm long; flowers to 20 mm diameter; peduncles 6–10 mm long and style to 20 mm. The variety *formosa* is more compact in habit, with smaller leaves and floral parts. Photograph on page 229.

Verticordia muelleriana is a tall, openly-branched shrub to 2 m high with large orbicular leaves to 9 mm wide with narrow, translucent white margins. The large flowers are maroon to blood red with very glandular staminodes and 7–9 sepal lobes. The type form has petals to 5 mm long including the fringe and a style to 8 mm long with crowded beard hairs to 1.2 mm. The subspecies *minor*, with smaller flowers has shorter and less-crowded hairs to the style beard.

Verticordia argentea, a tall shrub to 2 m high similar to *V. muelleriana* with similar rounded leaves. Flowers are pale pink with a silvery-white fringe to the sepals and a fairly straight style with a beard of short hairs to the upper third.

Verticordia venusta a tall shrub to 2 m high similar to *V. muelleriana* but has smaller leaves, usually to 4 mm long, and a shorter, less-curved style with shorter beard-hairs. The flowers are usually rose pink but maroon forms are found.

Verticordia chrysostachys, a tall, openly-branched shrub to 2 m high, is similar to *V. muelleriana*. The exserted style, 5–7 mm long, has an s-shaped apex and a beard of hairs to 0.5 mm long. The staminodes are as long as the stamens and the petals are fringed. The type variety has deep yellow flowers with varying degrees of red spotting to the petals and reddening of the sepal lobes. The petal fringe is obtuse. The variety *pallida*, usually with recurved leaves, has pale yellow or cream flowers with slightly smaller petals, the fringe segments of which are acute.

Verticordia dichroma, a shrub to 2 m high, is similar to *V. chrysostachys*, but the flowers are maroon and yellow on shorter peduncles, 1.5–2 mm. The staminodes are shorter than the stamens and the style hairs, to 0.9 mm, are longer. The type variety has strongly reflexed leaves 3–4 mm long; sepals to 6 mm long and petals to 7 mm long with a fringe to 2.5 mm. The variety *syntoma*, has smaller flowers and less reflexed leaves. Shown in garden scene on page 193.

Verticordia alba, a shrub 2.7 m high is similar to *V. chrysostachys* but has pink-centred white or pink flowers. The 4–5 mm long petals are almost orbicular with a fringe to 1 mm long. The stamens are sparsely glandular and the slightly curved style has only sparse hairs to 0.7 mm long. Photograph on page 196.

Verticordia aereiflora, a slender shrub without a lignotuber, to 1 metre, is similar to *V. chrysostachys* but differs in having smaller groups of flowers with smaller petals. The sepals are yellowish with a deep red or reddish-bronze fringe to 4.5 mm long. The petals, yellow with red spots, are deeply fringed across the apex. The staminodes are united with the stamens for half their length, the free apices prominently glandular, sharply narrowed and acute.

Verticordia* × *eurardensis is a much-branched shrub to 1 metre high with a lignotuber. It is a naturally-occurring stable hybrid between *V. dichroma* and *V. spicata*. The magenta to maroon flowers are on shorter peduncles than the former parent and have a smaller hypanthium with more acute appendages. The sepals have narrower, acute lobes and the petals are broader. The leaves also differ being narrower and more crowded. It differs from *V. spicata* in having a larger hypanthium, a longer petal fringe and different flower colour. The leaves also are less crowded.

Verticordia forrestii is a bushy shrub to 1.5 m high. Except for the tropical species noted in Section Tropica, its range of distribution is among the most northerly of the genus. The flowers are pink with the petal marginal hairs acute and the stamens equalling or exceeding the style. The leaf margins are erose.

Verticordia serotina, a shrub to 70 cm high, is similar to *V. forrestii* and occurs in the same area. The leaves and deeper pink flowers are larger than the above species and the flowering period is a little later. The hypanthium is 5 mm long and the sepals to 9 mm long and 14 mm wide. The petals are 6 mm long and 4–5 mm wide and the style 8 mm long.

Verticordia fragrans is an openly-branched slender shrub to 2.5 metres tall. The staminodes are oblong, acute, incurved and glandular. The 3 mm long hypanthium is warty and glabrous and the appendages broad and thick. The fragrant flowers, 9–10 mm diameter, open pale pink and age to white. The orbicular petals, with entire apices, have hairy auricles. The sepals have 6–9 plumose lobes with orbicular, fringed auricles.

Verticordia lepidophylla is a bushy shrub to 2 m high. The leaves and flowers are smaller than most other species in this section. Flower colour is pale yellow. The staminodes are channelled and flared. The style, to 6.5 mm long, has beard hairs to 0.6 mm long surrounding it for several mm. The type variety has sepals to 4.5 mm long divided for about 2/3 their length into fringed lobes. The petals are dentate to erose, at least on the lateral margins. The variety *quantula* has smaller, less-divided sepals and entire petals.

Verticordia comosa, a bushy shrub to 1.5 m high, similar to *V. lepidophylla*, but the petals are prominently fringed. The sepals and petals are slightly larger and the style is shorter and has a comose beard. The 2–4 mm long leaves are squarrose.

Study Groups — These comprise Society members who collaborate (usually by mail) to exchange experiences on cultivation and propagation of a group of plants. This issue reports on the *Verticordia* Study Group that is attempting and slowly succeeding with a particularly difficult group of plants. On page 235 we refer to the Australian Daisy Study Group, an easier group of rewarding plants. Interested, contact the Society Secretary of your state as listed on page 235.

Correction — to our No. 144 issue, page 163. From Lenore Lindsay, Australian Food Plants Study Group. *Pongamia pinnata* is definitely not edible. A reddish oil from the seeds has been used in the Indo-Pacific region for treating skin diseases and rheumatism and the Aborigines used the pounded roots as a fish poison which did not affect the edibility of the catch. *Barringtonia racemosa* fruit is also not edible, it too was used as a fish poison.



△ *Verticordia humilis* (see page 225)
Photography by Dick Mills

▽ *Verticordia verticordina* (see page 223)
Photography by R. and R. Wilkinson





△ *Verticordia cooloomia* (see page 219)
Photography by M. Pieroni

▽ *Verticordia staminosa* subsp. *cylindracea*
(see page 219) Photography by M. Pieroni



The *Verticordia* Ladies

Elizabeth George and Margaret Pieroni are two of the loveliest, genteel ladies I have ever met. Their charm is exceeded only by their competence in botany and in the case of Margaret, artistic flair. Alex George, the leading botanist on the world scene for *Verticordia* (and many other groups of plants) has encouraged these ladies to become world authorities on this group of exquisite plants. For Elizabeth it has been a close study for over 20 years and her efforts will culminate in a book to be published next year. Every species will be adequately described and each will be illustrated by a large, full page colour painting which will also include details of all the botanical features. The support of these ladies in the preparation of this issue is gratefully acknowledged.

Wildflower Nurseries in Queensland

Fairhill Plants and Botanic Gardens — Huge range; rainforest plants, grafted grevilleas, rare plants, wildflowers, ferns, orchids, revegetation trees. Extensive display gardens. Open every day 8.30 a.m.–5.00 p.m. Fairhill Native Plants, Fairhill Rd., Yandina, Qld 4561. Tel. (074) 46-7088.

Wildflower Nurseries in New South Wales

Annangrove Grevilleas — 98 Annangrove Road, Kenthurst 2156. Tel. (02) 654-1380. Wide range of natives including hundreds of different species in tubes — many hard to get. Ten per cent discount to SGAP members.

Bryants Native Plant Nursery — Cosy Camp Road, Bex Hill, N.S.W. 2480. Tel. (066) 28-4323. 15 kms north of Lismore. Open 7 days (from 11 a.m. on Sundays). Extensive range of trees, shrubs, groundcovers, rockery, grafted Grevilleas, rainforest plants. Excellent quality and service.

Dealbata (cold climate) Aust. Plant Nursery — off Bloomfield St., Dalgety, 2630. Tel. (064) 56-5043. Specializing in alpine and dry Monaro plants — grown from locally collected material. Phone to arrange visit.

Floralands — Parry's Nurseries Pty. Ltd. Kariong via Gosford, 2250. Tel. (043) 40-1142. Preservation by cultivation. Send \$1.50 for descriptive catalogue.

Kentlyn Native Plants — 206 George's River Rd., Campbelltown, 2560. Tel. (046) 25-1583. Open 7 days.

Newcastle Wildflower Nursery — 45 Pacific Hwy, Bennetts Green 2290. Tel. (049) 48-8576. Extensive range of native plants including rare and endangered species.

Sydney Wildflower Nurseries — South at Heathcote (02) 548-2818; West at Marsden Park (02) 628-4448; North at Terrey Hills (02) 450-1555. Excellent range of native plants, open 7 days.

Wariapendi Farm Nursery — Church Ave., Colo Vale (7 km north of Mittagong off F5, take Colo Vale exit). Tel. (048) 89-4327, Fax (048) 89-4092. Growers of frost hardy natives from tubestock to advanced. Open 7 days.

Wirrimbirra Native Nursery — Hume Hwy, between Bargo and Tahmoor E. side 2574 (3 km from Freeway entry). Wide range including unusual plants. Tel. (046) 84-1112.

Wirreanda Nursery — End of Wirreanda Rd., Ingleside, 2101. Tel. (02) 450-1400. Growers of advanced and semi-advanced native trees and shrubs. Open 7 days.

Wildflower Nurseries in South Australia

Anne and Colin Dealtry — Lot 2, Trevilla Rd, One Tree Hill, SA 5114. Large range of tube-stock plants. Display Gardens. Open most of the time but phone to check. (08) 280-7079.

Brenton Tucker Native Plants and Carawatha Garden — off Placid Estates Rd, Wellington East via Tailem Bend. Tel. (085) 72-7104. Wide range of tubestock and advanced plants. Extensive display gardens and picnic areas. Open w/ends and public holidays September to November and April to June — 10.00 a.m.–4.00 p.m.

Nesbitt's Orchids — P.O. Box 72, Walkerville, S.A. 5081. Tel. (08) 261-1550, Fax (08) 266-0372. Specialists in the propagation of Australian terrestrial orchids. Send S.A.E. for list and culture notes.

Wildflower Nurseries in Tasmania

Plants of Tasmania Nursery — 65 Hall St., Ridgeway 7054. SAE catalogue. (002) 39-1583. Closed Tue & Wed.

Wildflower Nurseries in Victoria

Bushland Flora — Indigenous plants of Melbourne. Ph. (03) 736-4364 for stocklist.

Kurunga Native Nursery has the largest range of native plants in Australia. Specialists in rare, collectors and hardy varieties, rainforest and grafted plants, grasses and Melbourne's indigenous plants in forestry tubes and more. 393 Maroondah Highway, Ringwood 3134. Ph. (03) 879-4076. Open 7 days. Delivery Australia wide. Stocklist free.

Australian Wildflower Seed Suppliers

R. Horner — 1 Grundy St., Alice Springs, N.T. 0870. Seed of trees and shrubs of Central Australia. Please send 45¢ stamp for a list.

Western Australian Wildflower Society — P.O. Box 64, Nedlands 6009. A wide selection of Western Australian seeds is available at \$1.00 per packet, plus postage of 45¢ for a number of packets. Send for a catalogue for \$2.00 plus 80¢ postage. A huge range of seeds at a price you can afford expertly collected, labelled and packed. A book "Hints on Growing..." 40 pages, \$3.80 posted.

Australian Brachyscomes — Completely compiled, produced and marketed by the Australian Daisy Study Group, this excellent book is the almost ideal reference. There are 75 Australian species currently recognised and these are described. For each species there is distribution, description in simple but accurate and complete terms, flowering period, propagation, the various forms and varieties and details of how the species differs from similar species. The presentation attempted is for a full page sketch of the species with enlarged detail of the fruit, opposite a full page of the above data. The amount of data is often so great that more than one page is necessary but the sketches, exceptional in detail, manage to fill all right hand pages.

There will be more in future issues, this book being such a gem, but you would be advised to order your copy quickly as only 1,000 copies have been printed. The last book by the Australian Daisy Study Group is now a rare out of print book and reprinting is not proposed. The price is \$29.95 plus packing and postage of \$8.40 (more for NT and WA). Available only from Australian Daisy Study Group, 38 Pinewood Drive, Mt Waverley, Vic. 3149.

"Australian Plants", The Australian Flora Periodical

Past issues are available in volumes 4-10/11, each volume is bound and cased, beautifully presented with green vinyl covering and gold lettering for \$21.00, plus \$5.00 post. Volumes 12, 13, 14 and 15 are available only from The Editor, Australian Plants, 860 Henry Lawson Drive, Picnic Point 2213, for \$40 each plus \$6 postage.

Binders to hold the eight separate issues of Australian Plants in a volume are \$5.50, plus \$3 post.

Other Books Published by the Society:

"Australian Indigenous Orchids", Revised Edition, by A. W. Dockrill. 2 vols. \$84 each including post.

"Australian Plant Genera" by J. A. Baines. \$9, \$5 post.

"Cradle of Incense" by G. W. Althofer. A delightful book on Mint Bushes. The Genus *Prostanthera*. \$8, \$3 post.

"Friends and Foes in your Garden" by D. Hockings. The best guide on pest and disease control. \$20, \$6 post.

"Language of Botany" by C. N. Debenham. An outstanding reference to botanical language. \$16.50, \$3 post.

Book Supply Mail Service. For back issues of *Australian Plants*, bound volumes and binders, send orders to P.O. Box 410, Padstow, NSW 2211. Other book orders to Florilegium, P.O. Box 644, Rozelle, NSW 2039, phone (02) 555 8589, or by fax (02) 818 4409, at recommended retail price but post free; orders in excess of \$50 a discount of 10% is provided.

The Australian Flora Foundation

President: Dr M. L. Reed — Give to research into the biology and cultivation of the Australian flora. Tax deductible donations and bequests go to research projects carefully chosen. Reports available annually for \$10.00. Write to GPO Box 205, Sydney 2001.

The Societies for Growing Australian Plants

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS—NSW LIMITED:

President: Mr Jim Boswell, 12 Madison Place, Bonnet Bay, NSW 2226.

Secretary: Mr Allan Woollett, 3 Currawang Place, Como West, NSW 2226

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS—CANBERRA REGION INC.:

President: Mr Paul Carmen, 52 Worralul Street, Waramanga, ACT 2611.

Secretary: Ms Cindy Royston, 41 Jamieson Crescent, Kambah, ACT 2902.

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS—QUEENSLAND REGION INC.:

President: Mrs Lorna Murray, P.O. Box 586, Fortitude Valley, Qld 4006.

Secretary: Ms Jan McNicol, P.O. Box 586, Fortitude Valley, Qld 4006.

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS—SOUTH AUSTRALIAN REGION:

President: Mr Tony Hill, 20 Murray Street, Clapham, SA 5062.

Secretary: Mr Mick Freeborn, 5 Marram Terrace, Largs North, SA 5016.

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS—TASMANIAN REGION INC.:

President: Mr Warner Wait, GPO Box 1353P, Hobart, Tasmania 7001.

Secretary: Ms Els Hayward, GPO Box 1353P, Hobart, Tasmania 7001.

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS—VICTORIA INC.:

President: Mr Royce Raleigh, RMB 7372, Horsham, Vic. 3400.

Secretary: Mr Paul Kennedy, 17 Craig Court, Heathmont, Vic. 3135.

WILDFLOWER SOCIETY OF WESTERN AUSTRALIA INC.:

President: Mrs Anne Homes, Box 64, Nedlands, WA 6009.

Secretary: Mrs Barbara Dewar, P.O. Box 64, Nedlands, WA 6009.

Office open Tuesday/Thursday — Tel. (09) 383 7979 (24 hr answering service).

ASSOCIATION OF SOCIETIES FOR GROWING AUSTRALIAN PLANTS INC.

The autonomous state societies above are united under this federal body.

President: Mrs Cheree Densley — Secretary: Mr Paul Kennedy

PUBLISHED BY THE SOCIETY FOR GROWING AUSTRALIAN PLANTS — NSW LIMITED.

Under the direction of the PUBLISHING COMMITTEE — Editor: W. H. Payne.

Assisted by: P. D. Leak, B. Maloney, J. Robinson and P. Bailey.

Editorial Material: Editor, Australian Plants, 860 Henry Lawson Drive, Picnic Point 2213. Enquiries by mail only.

PUBLISHING COMMITTEE: D. G. Brooks (Chairman), I. Cox, P. Olde, R. Page, W. H. Payne, H. Stacy and J. Boswell.

Address all **non-editorial correspondence** to: SGAP Publishing Committee, P.O. Box 410, Padstow, NSW 2211.

ALL PUBLISHED MATERIAL IS COPYRIGHT AS DIRECTED BY AUTHORS.



Verticordia penicillaris (see page 223) ▽
Photography by P. Moyle

△ ***Verticordia spicata*** (see page 227)
Photography by P. Moyle

