Journal of the HARDY ORCHID SOCIETY

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The Hardy Orchid Society

Our aim is to promote interest in the study of Native European Orchids and those from similar temperate climates throughout the world. We cover such varied aspects as field study, cultivation and propagation, photography, taxonomy and systematics, and practical conservation. We welcome articles relating to any of these subjects, which will be considered for publication by the editorial committee. Please send your submissions to the Editor, and please structure your text according to the 'Advice for Authors' (see website, January 2004 journal or contact the editor).

The Hardy Orchid Society Committee is ....

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Ordinary Member: Doreen Webster: details as Show Secretary.

Serapias lingua - **Best Plant in the Show 2004 - Michael Powell**
Photo: John Humphries

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HOS Subscriptions are Due

Maren Talbot, Membership Secretary

Our membership year starts on the 1st May and finishes on the 30th April. Only half the payments due have been received so far. If you have not paid your subs yet for 2004/5, please do so now. The new rates are:
UK & Europe: **£12** single, **£15** family,

Rest of World: **£16** single, **£19** family.

New Members please add **£2.50 Joining Fee***.

Please make your cheque payable to **The Hardy Orchid Society** and send it to **Maren Talbot, 4 Hazel Close, Marlow, SL7 3PW.**

If you can be persuaded to pay by standing order, please let me know and I'll send you the appropriate form. Please send the completed form **to me** at the above address.

*We'll waive the £2.50 joining fee for new members who opt to pay by standing order.

Report on the 12th AGM of the HOS

Sunday 25th April 2004, Exeter Hall, Kidlington

Richard Manuel reported that the year had been both busy and successful, with good attendance at meetings and field trips, an increase in membership numbers, and continuing improvements to the website and Journal. The experiment of a Northern Meeting at the RHS Harlow Carr Gardens near Harrogate had been an encouraging success, so a repeat is scheduled for 12th September this year (see separate note). The

three field trips, for which the organisers Norman Heywood, Tony Beresford and Bill Temple were warmly thanked, had been most enjoyable. A repeat visit to Kenfig Dunes to see the Fen Orchid is scheduled for 26th June this year.

Tony Hughes was thanked for initiating and developing the HOS website over several years. The job had been passed to Bill Temple earlier in the year, who would be pleased to receive members' material.

The Newsletter is now called "The Journal of the Hardy Orchid Society", and has developed significantly - full colour throughout - thanks to Patrick Marks' efforts.

Richard then announced that our President, Prof. Richard Bateman, had come to the end of his 3 year term in office, the maximum time allowed by our constitution. Richard thanked Prof. Bateman for the considerable amount of time and effort he had devoted to promoting the HOS. He then proposed that the post of President should remain vacant for a year, with a view to re-electing Prof. Bateman next year. Meanwhile, the Committee would review the HOS Constitution, aiming to ease some of the tight constraints they had been working under.

Richard Manuel himself had also reached the end of his 3 year term, and warmly thanked all the Committee for their support throughout his term in office.

The Treasurer, Rosemary Hill, reported that the finances were healthy, with net assets of £6823, roughly equal to one year's expenditure. The small loss over the year of £405 had been budgeted for, in order that a full-colour Journal could be produced prior to the increase in subscriptions which was just coming into effect.

The Membership Secretary, Maren Talbot, reported a 7% increase in membership over the year, with 439 members now on the books.

The election for the HOS committee saw only a couple of changes, with the bulk of committee members being re-elected 'en bloc'. Tony Hughes was elected Chairman, while Richard Manuel and Prof Richard Bateman stepped down from their respective posts. The vacant posts of President and Vice-Chairman were not filled.

The new-look Journal was discussed at length, with a number of recommendations coming from the floor. The new Chairman, Tony Hughes, confirmed that the Committee would be constantly reviewing the quality of the Journal, and would consider all the suggestions.

Tony then thanked Richard Manuel for all his hard work and considerable achievements during his three years as Chairman. Finally, he emphasised that the main aim of the Committee was to provide the membership with the Society they desired, but that this was a two-way process. Five principal types of activity were mentioned.

Regarding Meetings, members could help by volunteering to give a talk, or by suggesting good speakers and interesting topics for lectures. Ideas were always welcome forfield trips, particularly if someone would like to show members around their own favourite haunts. The Journal always needs contributions from members, plus suggestions for topics to be included. The website thrives on input from members, and our conservation work could be expanded if our Conservation Officer were kept informed of opportunities for such activity.

HOS Plant Show - April 25th 2004

Thanks to the twelve exhibitors who made a very interesting show this year with 38 plants on the show bench. Four of these were non-competitive exhibits so thanks go out to those people too, although I do feel their plants could have been put in the competition as they were very interesting plants.

Blair Sibun was an excellent judge and made sure all was fair. He paid special attention to the condition of the plant including the foliage. Thanks Blair for a job well done.

The **Best Plant in the Show Trophy** this year went to Michael Powell for his *Serapias lingua*. How nice to see a Serapias get the best in show. There was an obvious lack of Cypripediums this year, but Eric Hodgkins' *Cypripedium plectrochilum* caused a lot of interest and was a talking point for the members.

I feel I must thank those people who helped to get the show off the ground and those who took photographs which I am sure will be used for the website and the journal.

RESULTS:

There were no entries in Classes 1, 2 and 5.

Class 3		
1st	Michael Powell	*Ophrys lutea x speculum*
		Anacamptis (Orchis) morio
		Orchis quadripunctata
2nd	John Haggar	*Anacamptis (Orchis) morio x Alata*
		Anacamptis (Orchis) morio
		Neotinea ustulata
Class 4		
2nd	Richard Manuel	*Pterostylis ingens*
		Pterostylis erecta
		Pterostylis pedunculata
Class 6		
1st	Richard Manuel	*Anacamptis (Orchis) morio*
2nd	Neil Hubbard	*Anacamptis (Orchis) morio*

Class 11 *Ophrys fuciflora*
Alexander Jeans

Class 13 - *Cypripedium plectrochilum*
Eric Hodgkins

Class 14 *Calanthe bicolor*
Doreen Webster

Class 6 *Anacamptis (Orchis) morio*
Richard Manuel

Class 7

1st	Doreen Webster	*Anacamptis(Orchis)papilionacea var grandiflora*
2nd	Nick Storer	*Anacamptis (Orchis) syriaca*

Class 8

1st	Maren Talbot	*Pleione* 'Tongariro'
2nd	Doreen Webster	*Calanthe tricarinata*
3rd	M Brownsword	*Calanthe sieboldii*

Class 9

1st	Michael Powell	*Dactylorhiza sambucina* - Red form

Class 10

1st	Peter Scott	*Orchis mascula*
2nd	John Haggar	*Orchis mascula*

Class 11

1st	Alexander Jeans	*Ophrys fuciflora*
2nd	Michael Powell	*Ophrys lutea*
3rd	Peter Scott	*Ophrys fuciflora*

Class 12

1st	Michael Powell	*Serapias lingua*
2nd	John Haggar	*Serapias parviflora*

Class 13

1st	Eric Hodgkins	*Cypripedium plectrochilum*
2nd	Rosemary Hill	*Cypripedium formosanum*

Class 14

1st	Doreen Webster	*Calanthe bicolor*
2nd	Richard Manuel	*Diuris corymbosa*
3rd	M Brownsword	*Pleione bulbocodioides*

The HOS Harlow Carr Meeting

Sunday September 12th 2004

Following the success of last year's meeting, we are returning to the Study Centre in the RHS Garden at Harlow Carr. An application form for the meeting is included with this Journal. Please note that advanced booking is essential. Space in the Study Centre is limited to 60 people, so places will be allocated on a "first come, first served" basis.

Harlow Carr Garden is in Crag Lane (HG3 1QB), just off the Otley Road (B6162) on

the west side of Harrogate. You will be required to show your HOS Membership Card to get free entry to the garden.

The provisional programme is as follows (details subject to change):

10.00 a.m.	Doors open; Tea/Coffee; Sales tables.
10.45 a.m.	Chairman's Introduction
10.50 a.m.	Alan Gendle "Orchids of the North West"
11.55 a.m.	Peter Corkhill "Chinese Cypripediums"
1.00 p.m.	Lunch
2.15 p.m.	Peter Sheasby "Photographing Flowers - My Way"
3.15 p.m.	Tony Hughes "Orchids of Sicily"
4.15 p.m.	Tea/Coffee
5.00 p.m.	Meeting closes

Hardy Orchids around the World

Report of a talk by Captain Peter Erskine

In his first bound, Peter was off to Nepal, Tibet, Western China, then across to Australia, Tasmania and New Zealand. From there, he crossed the Indian Ocean to South Africa and Lesotho, and then the Atlantic Ocean to South America, starting at Patagonia and working his way up the central chain off the Andes to Chile on the west coast.

In reality, these journeys represented the efforts of several years, guiding parties of enthusiastic Alpine Garden Society members in their search for plants. However, on our behalf, a careful sieve had been applied to the plants encountered. The sieve related to a plant's possible hardiness in the UK, in particular, in relation to an alpine bed of plants. Whilst there was a handful of near - suitable orchids in the first two regions, any plant growing below 1900 metres at latitudes between 30^0 N and 35^0 S is doubtful for hardiness in the UK. Further difficulties arise since few plants from below about 2500 to 3000m altitude would enjoy our climate. For example, plants from either side of the Himalaya prefer monsoon climatic conditions, with rains and summer heat that are difficult to match in the UK. Nevertheless, there were numerous species at or well above 3000m, particularly of course the *Cypripediums* of Western China.

Alas, none of the mountain ranges of Australia or Tasmania had the altitude when referenced against the latitude to promote the necessary hardiness. Although temptations were presented with the *Pterostylis* species, they are all from the lowlands ! The south island of New Zealand was more promising, but care would be very necessary in selecting suitable species with the *Caladenias* appealing greatly.

The upper ranges of Southern Africa "the Drakensburg and Lesotho" presented possibilities, with some gorgeous *Disas* climbing to 3000m, but these were the tempting few.

Peter's main theme now centred on the South American countries, starting with Patagonia and travelling north to Chile. Here, the *Chloraeas* overwhelmed all of us. Kew had been provided with seed but, despite efforts none has germinated to date. Alas, the efforts required to gain access to the orchids appeared to me to be for those still young of body and mind, the latter OK, the other no longer me ! Peter's travels covered a wide range of habitats but the upper reaches of the mountain ranges yielded magnificent plants, to say nothing of the equally magnificent scenery.

This was a talk where I sat and watched and listened but failed to keep notes, as you might well tell from the brevity of this synopsis. The enormous range of countries visited, areas traversed, plants photographed and details of habits noted, left me envious in the extreme. All I can say is "you should have been there !" Thank you Peter, a marvellous presentation.

Pleiones

Report of a Talk by Ian Butterfield

Ian began his talk with a description of the area most recently visited, namely Bhutan, south of the Himalayas, when pleione were most likely to be entering into a flowering state. The wide area of Asia from which pleiones come includes the Himalayas of Nepal, India and China, then eastwards into the lands of Burma, Thailand, Laos, Vietnam, with central China extending across to Taiwan [syn Formosa].

He showed 3 D views of the principal habitats and plant species encountered – rock-face and cliffs, tree limbs (epiphytics) and at ground level below these upper regions where fallen plants had rooted successfully. As with many of the epiphytes, the example shown consisted of a near 10 m long tree limb covered in moss, filled with flowering pleiones requiring a telephoto lens to view since access was impossible. The search for dormant offsets – tiny 1 or 2 mm diameter plants perhaps 10 mm long, in cracks on cliff-faces was shown in all its difficulty.

The epiphytic species seem to yield the best recommended growing conditions, name-

ly a very 'fluffy' moss with a little chipped tree bark and an underlying stratum of heavier compost. The bulbs and bulbils that Ian was growing were simply 'nested' into such free-draining material retained in plastic flat-pots (~15 cm diameter, ~7 cm deep). In natural circumstances, moisture seemed to come from constant cloud and mist, with rising cloud coming up the valleys at daybreak. Altitudes for the different 17 species varied, but those encountered in this visit were mostly between 1900 and 2500 metres, although some grow at up to 4000 m altitude.

Species are divided into spring-flowering and winter-flowering forms, with a growing season limited to around 6 months and cool, slightly damp conditions maintained during the dormant season, when the main flowering annual bulb dies, leaving much smaller bulbils to grow on for between 2 and 3 years before reaching flowering size again. Growing problems required sulphur dusting, followed by 'oiling' corms to eliminate mite-damage, with 'Maxicrop/Maxifeed' fertiliser sprays during the flowering period and fungicidal sprays to control rot.

The colour variations among the species ranged from purple, through red, into yellow and then pure white. Many had beautifully marked throats with small linear/spot to near complete purple-patch markings, greatly enhancing the beauty of these small orchids, which ranged from 2 or 3 cm near-stemless blooms up to 15 cm long stems supporting blossoms, occasionally of more than single flower heads on a stem.

Ian then went on to show the substantial programme of hybrids that he raised, discussing several very new forms only just bred in the past year or two. The plants he raises leave this author drooling over the expertise displayed, the care taken with all the pleione variations and the sheer beauty of this magnificent genus.

Orchids and a few other plants of Crete.

Report on a talk by John Fielding

John started his talk in the White mountains of western Crete and worked down in altitude. Crete is well known for its endemic flora, which includes *Centranthus sieberi, Anchusa caespitosa* and the sweetly scented *Arum idaeum.* There is great variation in the terrain in the mountains with some areas of good tree cover and other areas, which are badly affected by grazing. Thankfully this did not effect *Cephalanthera cucullata,* another endemic. The Dikti mountains towards the east of the island have good coverage of *Pinus halepensis* subsp. *brutia* on their southern slopes, whereas the endemic *Orchis prisca* can be found further east around Thripti. It is similar to *O. anatolica* but fairly distinct and taller. Back in the White mountains *Paeonia clusii*, the only endemic *Paeonia* found in Crete, grows in light shade along with *Daphne sericea* and *Cyclamen creticum.* The endemic *Himantoglossum affine [syn. samariense]* can also be found in this area, as is *Orchis quadripunctata* and the natural hybrid *O.*

quadripunctata x anatolica.

Primula vulgaris grows alongside *Cyclamen creticum* in the lower woodland habitats of western Crete. *Listera ovata* can also be found in these conditions with *Ophrys apifera* and *Spiranthes spiralis* on the edges of woods.On the Gious Kambos above Spili in the centre of the island, orchids abound, including *Orchis laxiflora, O. italica* and *O. lactea. O. simia, O. boryi* and its white form are also found; these are unusual in that the flower spike opens from the top down. *Serapias lingua* is widespread and a distorted form was shown where two side petals had tried to form a lip. This stoloniferous orchid easily colonises large areas with its many colour variants, which include pale yellow. The more ornate *S. orientalis* was also shown.

Ophrys cretica and its various subspecies are common over much of Crete, as is *Orchis collina* which was shown growing with *Gagea graeca. Barlia robertiana* often has dull-coloured flowers with a tinge of green, but they are often picked for their sweet scent.

In the south-east, the land around Ierapetra is dominated by polythene crop houses, while the slopes above this area have been badly affected by fires in recent years, though scrub is now growing back.

Anatoli provides a good site for the clump forming *Ophrys tenthredinifera, O. omegaifera,* plus *Orchis anatolica* which is more common in the eastern half of the island. *Ophrys sitiaca* is only found in the eastern part of Crete and flowers in February, as does the large-flowered *Ophrys basilissa, which* is found near the coast in the north east. *Ophrys fleischmanii* flowers in February at approximately 600 metres, but can also be found near the coast.

Other orchids shown were *Ophrys fusca* subsp. *creberrima, O. heldreichii, Anacamptis pyramidalis* (alongside *Ranunculus asiaticus*) and *Orchis papilionaceae* subsp. *alibertis*, which is possibly endemic to Crete.

The autumn flowering *Cyclamen graecum* subsp. *graecum* is only found in the west, and this part of the island has many plants which only appear here and in the Peleponese. The large leaves of the autumn-flowering *Colchicum macrophyllum* are commonly seen by spring visitors to the island, a plant which can have good or bad flowering years. *Arum concinatum* is common throughout the island. It adds to the wide range of April colour schemes, when the pink-flowered endemic *Ebenus cretica* covers the hillsides. This plant has a taproot, which resents disturbance and has proved difficult in cultivation.

The herbaceous *Viola scorpiuroides* can be found on the coast at Vai in the far east, an area which is a crossroad between Europe, Asia and Africa and includes the famous

Palm trees. The last few slides were of *Orchis palustris*, now found only near Malia on Crete, and down to the last 300 plants.

Finally, John is currently providing photos for a flora of Crete to be published by the Royal Botanic Gardens, Kew - a welcome addition for both visitors to the island and orchid enthusiasts.

Orchid Photography - Part 2: The Whole Plant

Tony Hughes

The Objective is to depict an entire plant, from the basal leaves to the topmost buds, usually in a natural environment, though potted or garden specimens can also make interesting pictures. Many of the best pictures are those where the plant really stands out from its surroundings and grabs the viewers' attention. Those where the plant merges with its surroundings, although presenting a "true-to-life" image, are often photographically less appealing.

Technically, this is somewhat less challenging than taking a close-up, largely because the subject is further from the camera. A standard camera and general purpose lens are perfectly adequate, focusing is less critical, autofocus makes things even easier, depth of field requirements are readily met using moderate apertures and fast shutter speeds, and subject movement is not quite so disastrous.

Choice of Subject involves similar criteria as with close-ups, but it is often quite difficult to find a complete plant that is clean, undamaged and in an accessible position. One can spend a great deal of time searching a wood, meadow or hillside to find the very best specimen, but perseverance is usually rewarded. It is not always best to select the largest specimen, even if it is in good condition, because you then have to take your photograph from a greater distance, so less detail of the flowers can be seen in the comparatively low magnification image. Compact plants have a definite advantage over tall ones, and those with more than one flower spike often produce a more interesting picture. Avoid flower spikes with dead or dying flowers, but look for those with several flowers freshly open and some buds to come.

Composition of the picture starts with a major decision - do the surroundings of the subject enhance the picture of the plant or detract from it? When the background is little more than a confusing jumble of nondescript undergrowth, it is often better to keep it out of focus so that the sharply focused plant stands out clearly. In other situations, the surroundings will have sufficient artistic merit to complement the plant and thereby enhance the overall picture, in which case they are best captured in sharp focus. In either case, care should be taken to select a camera direction that presents both plant and background in the most appealing light. It is generally best to get down fairly low, possibly with the lens about level with the flowers, where it is fairly easy to get both

flowers and leaves sharply focused. High camera angles will probably require a greater depth of field and may produce strange perspective effects. Check that the plant is well centred and vertical in the frame, unless you have a really good reason for offsetting it.

Blurred Background pictures are the easier because the depth of field requirement is minimal. This is achieved with a fairly large lens aperture so that the resulting depth of field is just great enough to show all parts of the plant in sharp focus, but is insufficient to produce a sharp image of the background rubbish. If you are using an SLR camera with a "depth-of-field-preview" button, you will be able to see through the viewfinder the effect of aperture selection on the clarity of the background. A digital camera allows you to take several shots at different apertures without feeling too extravagant. The use of flash can help by increasing the contrast between the correctly illuminated plant and the under-illuminated background. If the flash can be held away from the camera, select its position to mimic where sunlight might come from in order to generate believable shadows. If you are lucky, your eventual picture will show a sharply defined plant standing out clearly against a tastefully mottled background.

Sharp Background pictures are effective when perhaps the specimen is in front of a tree with interesting moss or bark, or is beside some attractive rocks or foliage. A little more trouble is required, both in composition of the picture and in achieving adequate depth of field. A small lens aperture is called for to ensure that both the plant and its background are rendered with pin-sharp clarity. Inevitably this results in longer exposure times and greater risk of movement. A tripod definitely helps! Once again, the depth-of-field-preview button allows you to check that your selection of aperture is adequate. Flash is less likely to be useful, unless the plant and the background are at similar distances. If the background material is significantly further away than the plant, it will be under-illuminated, it will look somewhat unnatural and its impact will be reduced.

"Gardening" (i.e. disturbance or removal of surrounding plant material) is a somewhat contentious issue. Sometimes it is preferable to show plants in exactly the situations where they were found, whereas at other times selective "adjustment" of the surroundings can greatly enhance the artistic merit of the pictures. Particular attention should be paid to the base of the plant, where the leaves can be unnecessarily obscured by other material. While the careful removal of stones and dead stems or leaves is unlikely to damage the environment, it is harder to justify the removal of living plant material. My own preference is either to bend the offending material out of the way, or to cover it with something less offensive. Many is the time that a chewed orchid leaf or distracting non-orchid flower has been temporarily hidden behind a handy stick or stone! Of course, when the masterpiece has been completed, all the hidden bits and pieces should be released from their bondage.

The Foreground and Background both merit careful attention. As with close-ups, any blurred objects closer to the camera than the plant will produce serious visual distractions in the resulting picture. Be particularly wary of long stems of grass that might inadvertently blow into view at the last moment. The background has been mentioned under "Composition", but is probably worth a second thought. If an "out-of-focus" background has been selected, use the depth-of-field-preview to make sure that there are no disturbing highlights caused by bits of rock or dead grass that could safely be removed. With the "in-focus" background, check that all elements actually enhance the picture rather than draw attention away from the plant. I often spend a lot of time removing random stems of dead grass! But whatever adjustments you feel might be desirable, only make those that do not harm the environment.

A Sharp Picture should not be too difficult to achieve - provided the wind stops blowing!

On the Origin of Ophrys Species

Dr Svante Malmgren

Introduction

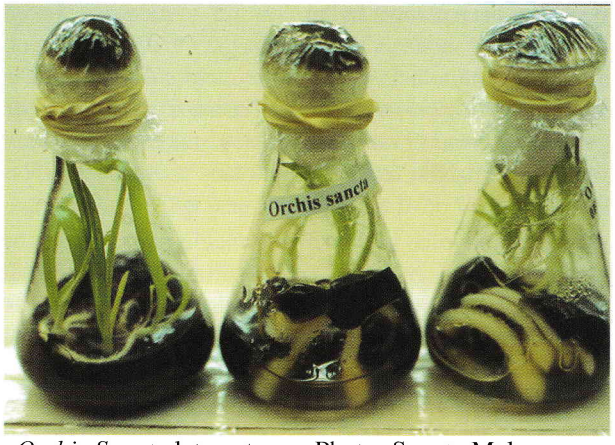
The genus *Ophrys* contains several well-defined species groups, but also a great number of supposed species some of which are more clearly separable than others. Many orchid researchers with an interest in the genus have tried to give their own names to "new" species (Delforge 1995). The resulting collection of forms resembles an album of old stamps containing many variations and misprints assembled by an eager enthusiast attempting to systematise his collection.

It has been suggested that *Ophrys* species are still actively evolving and that many new forms may have emerged in recent times (Bateman et al 2003). The concentration of species in areas like Greece, southern Italy and Iberia gives us an indication of the likely geographic locations in which most species have arisen (Davies, Davies & Huxley 1983).

In such areas, individual hybrids and hybrid swarms involving the genus *Ophrys* are found commonly and the parent forms can sometimes be identified (Rossi 2002). In many situations, however, they cannot. Some species have been considered to be of hybrid origin. If this is true, the question might be asked whether or not new species arise commonly in this manner ? If not, then it seems probable that new species simply emerge as a result of the mutation of pre-existing species and subsequent selection among these genetic novelties. The question is impossible to answer "in the field". By systematic hybridization and propagation from seed, however, a likely solution to the problem might be found.

Materials and Methods

In Sweden, my home country, only one *Ophrys* species is hardy through the cold win-



Orchis Sancta late autumn. Photo: Svante Malmgren

ters, namely *O. insectifera*. None of the other species that grow in Britain and Germany; *O. holoserica* (=*O. fuciflora*), *O. apifera* or *O. sphegodes,* is hardy here.

Fortunately, I am able to grow a large number of Mediterranean orchids under artificial conditions in a cool but frost-free cellar under fluorescent lighting. *Ophrys* species are amongst the easiest to grow of these plants. Over the last 30 years I have developed methods of asymbiotic propagation of terrestrial orchids from seed. I am able to raise a large number of different genera, species and hybrids on a large scale. Again, *Ophrys* are amongst the easiest to grow from seed and they typically flower three years after sowing (Malmgren 1992 (i) and 2002).

My basic medium for the asymbiotic propagation of *Ophrys* is detailed below:

$MgSO_4$	75 mg
$Ca_3(PO_4)_2$	75 mg
KH_2PO_4	75 mg
Vaminolac	5 ml (contains 300mg amino acids)
Sucrose	8 to 10 g
Agar	5 to 6 g
Activated charcoal	0.5 to 1 g
Tap water to	1,000 ml

To this medium I add 20 to 25 ml pineapple juice, which has previously been neutralised to a pH of approximately 6.0 using aqueous NH_3 or NaOH.

Results are often even better if, instead of pineapple juice, a one cubic centimeter piece of turnip (swede) is added to each 20 to 25 ml of the medium prior to sterilisation. The pH of the solidified gel is 5.5 to 6.0 if typical tap water sources are used.

Notes

(i) The complex organic component is a most important part of the growth medium. I use pineapple or turnip but other media may contain potato, banana or other complex additives. Although I have tried hard to substitute these with well-defined plant hor-

mones or other compounds my efforts have always failed.

(ii) The nitrogen source, Vaminolac (Vaminolact), is an amino acid solution used in hospitals for intravenous nutrition. A few *Ophrys* species (and some *Cypripedium*) do not respond well to it. For *O. holoserica* and *O. argolica*, I have successfully substituted 150 mg $NH_4H_2PO_4$ plus 100 mg NH_4NO_3 for the Vaminolac.

(iii) A few *Ophrys* species need pineapple juice in the sowing medium and all can be sown with it but later growth is very much enhanced on the turnip formulation. If uncertain regarding the requirements of a particular species, the seed may be sown on turnip medium with 1% pineapple juice and subsequently transplanted onto the turnip agar without pineapple.

(iv) The components of the medium do not need to be measured exactly. A 20% variation in the concentration of any ingredient produces no visible difference in results.

The seed is sterilised in a weak solution of NaClO until bleaching occurs. This kills contaminant microbes and breaks down the thin seed coat that surrounds the embryo. The seeds are sown directly from the bleach solution. The sowing flasks are then stored in the dark at 15 to 20°C.

Germination begins after two days to four weeks, depending on the species. Two to four months after sowing, when the protocorms have reached a size of 2 – 4 mm, they are transplanted onto fresh medium.

I grow the plants in 50 ml conical flasks with 20 to 25 ml of the medium in each. A flask of four to six seedlings produces plants of a good size, but increasing the number results in correspondingly smaller individuals. Even larger plants and tubers will grow at a density of one or two seedlings per flask.

After transplantation to the fresh medium, growth speeds up considerably and the flasks are exposed to artificial lighting (to avoid the heating effect of natural light) when the leaves have grown vertically by 10 to 20 mm.

Ophrys seed is best sown between April and June. Some species such as *O. cretica, O. speculum* and *O. spruneri* will have produced mature tubers of 5 to 15 mm diameter by the following February or March. Other species grow more slowly.

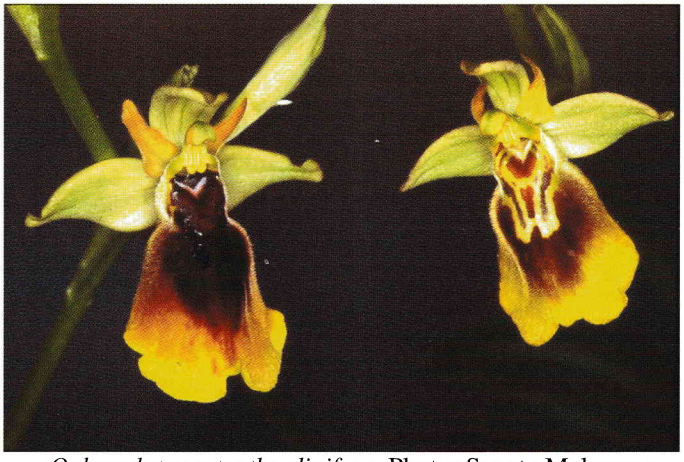
When the leaves have turned completely brown and the little tubers in the medium just slightly so, indicating cessation of growth, they are deflasked and transferred to soil. At this stage the soil should be reasonably dry but not arid. Ordinary "wild" soil from a limestone area works extremely well and requires no sterilisation or other pre-treatment. I usually put eight to fifteen tubers in a 10 cm clay pot and then allow the soil to

dry off completely. 50 to 75ml of water are subsequently added to the pot, which is placed in a plastic bag sealed with a rubber band.

Approximately four months later, usually in September or October, watering may begin. Some solitary plants may flower during their first year in soil. The majority (50 to 90%), however, will bloom in their second year in soil, which is a little under three years from sowing. The survival rate from medium to soil is usually 90 to 100%.

Results - *Ophrys* hybridisation

To date I have hybridised the following species: *Ophrys insectifera, O. holoserica, O. lutea, O. speculum, O.tenthredinifera, O. cretica, O. spruneri, O. cornuta, O. apifera, O.scolopax* and *O. argolica.*



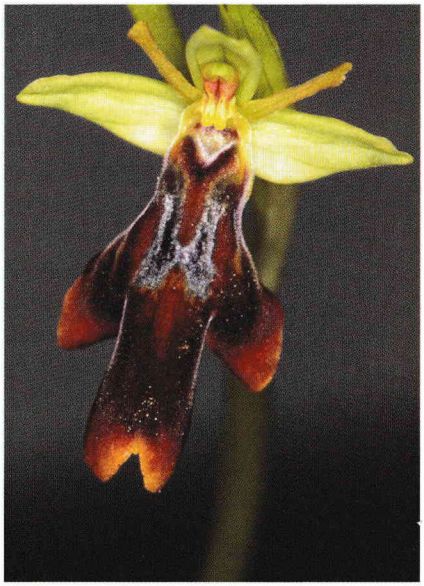
Ophrys lutea x tenthredinifera Photo: Svante Malmgren

After cross-pollination, viable seeds almost always develop. In the capsule, however, seeds containing viable embryos may vary from between 20 to 100% of the total seed content. In only one instance has no fertile seed developed. In some cases hybrid forms are more robust than either of the parent species.

So far, the following hybrids have been grown on to flowering size and several more are developing but have not yet flowered. The seed parent (mother) is described first and the pollen parent (father) second: *Ophrys insectifera* x *holoserica, O. insectifera* x *tenthredinifera, O. insectifera* x *speculum, O. insectifera* x *lutea, O. holoserica* x *lutea, O. holoserica* x *cretica, O. tenthredinifera* x *holoserica, O. speculum* x *lutea* and *O. lutea* x *tenthredinifera.* In two cases reciprocal crosses have also been made: *O. holoserica* x *insectifera* and *O. cretica* x *holoserica.* The only cross-pollination failure was that between *speculum* and *holoserica*. It is possible that another attempt would result in viable seed.

The intergeneric cross *Ophrys speculum* x *Anacamptis* (*Orchis*) *papilionacea* produced narrow seed capsules that contained about a hundred seeds. No embryos were visible microscopically, however, and no germination occurred.

The majority of *Ophrys* species appear to be able to produce viable F1 hybrids in the laboratory. At least twenty and in many cases up to a hundred plants of each hybrid have been grown to flowering size so that any morphological variation within the hybrid populations could be observed. With the exception of small variations in colour and labellar markings, the observed differences between individuals of each cross-pollination were negligible. The labellar morphology in the two reciprocal crosses appeared rather more similar to that of the mother plant when the crosses were compared.



Ophrys insectifera x lutea
Photo: Svante Malmgren

Ophrys cretica x holoserica
Photo : Svante Malmgren

Results of experiments to produce F2 hybrids

All the flowering hybrids were pollinated both with their own pollen and with that of at least one true species. The results of such pollination were almost identical which ever hybrid was involved. In every case except one, self-pollination did not yield viable seed. In most cases not even a seed capsule was produced but in some cases (e.g. F2 *tenthredinifera* x *holoserica* and F2 *tenthredinifera* x *lutea*) very large seed capsules formed. In the first example the seeds contained no embryos, and in the latter case a few solitary seeds germinated but produced defective individuals that were unviable even on the growth medium. With just one exception, viable seed was never produced when true species were pollinated with hybrid pollen.

The single case of an F1 hybrid with fertile (and self-fertile) pollen was that of *Ophrys cretica x holoserica.* 20 to 25% of the F2 seed germinated, producing leaves and tubers on medium. During the winter of 2002 to 2003, the resulting plants grew well on soil

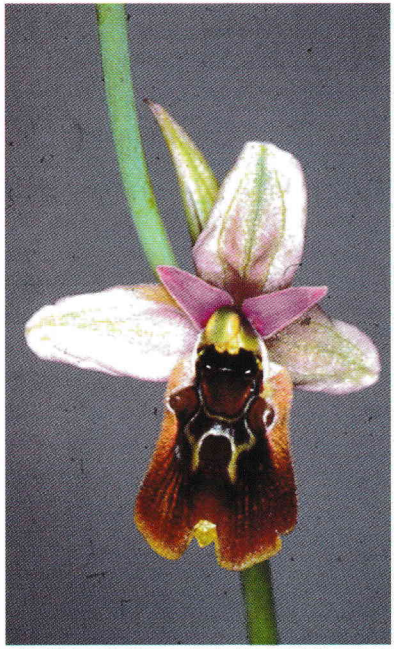
but they remain much weaker than F1 hybrid plants. They are too small to be able to flower in spring 2004.

To summarise these results, with the single exception of *O. cretica* x *holoserica*, all the F1 hybrids proved sterile when self-pollinated and their pollen could not be used to fertilise true species successfully.

Results of experiments to cross F1 hybrids with true pollen

If F1 hybrid *Ophrys* flowers are fertilised with pollen from a true species, however, viable seed may be produced that in some cases gives rise to new hybrid forms, feeble at times but also sometimes strong and viable. The first such cross out of flask was *O. (insectifera* x *tenthredinifera)* x *holoserica.* A few plants were successfully transferred to soil but even at seven years of age they remained weak and never flowered. They eventually declined further in vigour and died. The only such hybrid that has flowered to date is *O. (insectifera* x *tenthredinifera) x speculum.* Some plants were successfully raised on medium producing rather weak individuals in soil. A small number bloomed four years after sowing, but the flowering plants were just 10 cm tall and bore only three or four flowers each. One was self-pollinated but produced no seed capsule. Another was cross-pollinated with the pollen of F1 *O. cretica* x *holoserica* and a small number of seeds formed in the resulting capsule. This seed did germinate (a hybrid containing five species!) but all of the seedlings were malformed and unviable, even 'in vitro'. A fresh sowing, however, has produced a small number of seemingly viable and normal plants on medium; it will be interesting to see whether or not they prove capable of flowering.

The growth and viability of other such "secondary" hybrids is also unpredictable. On the one hand, *O. (lutea* x *tenthredinifera)* x *holoserica* grown on soil for two years appears quite vigorous but has not flowered this spring (2004), despite being three years old. On the other, *O. (lutea* x *tenthredinifera)* x *argolica,* which was still on medium during the winter of 2002 to 2003, has very large, dark green leaves and is on the verge of flowering. *Ophrys (lutea* x *tenthredinifera)* x *(cretica* x *holoserica)* is definitely larger and more vigorous than *O. (lutea* x *tenthredinifera)* x *holoserica* in its first year on soil.



Ophrys tenthredinifera x holoserica 2002 - white petals
Photo: Svante Malmgren

Even though these hybrids appear big and healthy, it seems very likely that in common with *O. (insectifera* x *tenthredinifera)* x *speculum* and with almost all the other *Ophrys* hybrids, they will be sterile if self-pollinated and could hardly be considered to be fertile hybrids (i.e. potential new species).

Conclusions

It seems unlikely that new *Ophrys* species arise from fertile hybrids. Only one F2 hybrid, *O. cretica* x *holoserica*, has survived a year on soil and it is weak. All the other F1 *Ophrys* hybrids lack viable pollen or seem unable to produce an F2 generation for some other reason.

When true species seed is sown almost 100% germination occurs and 90 to 100% of the plants survive. When full seed capsules of F2 hybrid seed are sown either none of the seed is viable or less often, a very few seeds germinate.

Based on these results, it seems most unlikely statistically that new *Ophrys* species originate via fertile F1 hybrids. We should, of course, accept that in nature this could occur but it seems more probable that new *Ophrys* species arise via mutation within true species followed by ecological filtration.

Similar hybridisation studies that I performed ten to fifteen years with *Dactylorhiza* showed that F2 hybrids are almost always fertile, but only if *D. incarnata* (including *cruenta* and *ochroleuca*) or *D. sphagnicola* was one of the parents. In the case of other crosses this seems not to be so (Malmgren 1992 (ii)).

The method of large-scale asymbiotic propagation is enlightening in that it allows the variation in form from a single seed capsule to be observed. Different characteristics like white or pink petals in the flowers of *O. tenthredinifera* develop in plants grown from the same seed capsule. I even have a plant of *O. tenthre-dinifera* x *holoserica* in which the colour of the petals changes from year to year; a change which must be epigenetic in origin. Many such variations in nature have been given varietal, subspecific or even specific names but my experiments suggest that many of these highly divided classifications lack validity. Flowers exhibiting all degrees of variation between "typical" *O. spruneri* and "typical" *O. ferrum-equinum* can be raised from one seed capsule of the former species.

Mutationally driven variation of this kind provides a better explanation for the genesis of new *Ophrys* species than hybrid origin.

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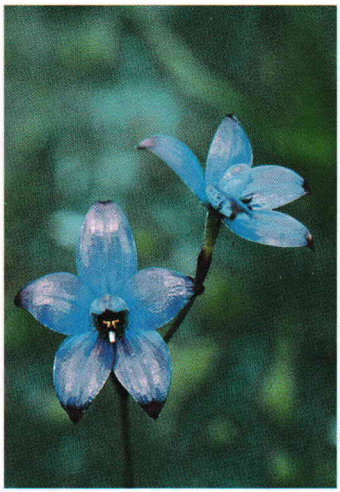
Australian Terrestrial Orchids

Jim Hill

Many of us forget that Australia is a continent nearer to the equator than most of Europe. Hobart in the south of Tasmania is on a similar latitude to Umbria in Italy and the north coast of Spain. Melbourne corresponds to southern Spain, the toe of Italy and Athens, Adelaide to North Algeria, Crete and Cyprus, Sydney to Casablanca and Tripoli in North Africa and Perth to Alexandria in Egypt. Much of Australia is arid or semi-arid, especially in summer, and forest fires are frequent. Light levels are high and snow and winter frosts are common only in parts of Tasmania and in the mountains of the Great Dividing Range, running north from Melbourne through Canberra, to the west of Sydney and into tropical Queensland. Most orchids occur within 300 miles of the coast and in the south, apart from a narrow coastalstrip, the Great Victoria Desert and Nullabor Plain provide an arid or semi - arid barrier between Eastern Australia (EA) and Western Australia (WA).

Caladenia rhomboidiformis
The Diamond Spider Orchid
Photo: Richard Lawrence.

There about 1100 species of orchids in Australia, 900 of which are terrestrial. About 600 in 30 to 40 genera of these are tuberous and growing in the temperate areas of Western Australia (WA), South Australia (SA), Victoria (Vic), New South Wales (NSW), Australian Commonwealth Territory (ACT) and Tasmania (Tas). The habitats are characterised, in the main, by being damp to wet in winter and often dry to very dry in summer. The soils are often sandy with much lower humus contents than are normal in Europe. Temperatures can drop to close to freezing in winter reaching well in excess of 30°C in summer. Flowering is usually during late winter to spring (July to November) or at other times according to species and location. Plants are often found in areas which have some shelter from sun, in open Eucalypt woodland, in scrub and in the lee of rocks. They are much less common in open grassland away from shelter, except in damp areas or near the coast.



Elythranthera brunonis
The Purple Enamel Orchid
Photo: Richard Lawrence

Most of the tuberous temperate orchids are members of the subfamily Orchidoideae. Some of these genera are transcontinental while others have a much more limited distribution.

Diuris, the Pansy Orchids or Donkey Orchids, occur in all six states. There are between 70 and 80 species with very few, if any, species occurring in both WA and the Eastern States. The predominant colour is yellow, although pink and purple species also occur. There are narrow linear sepals which go down behind the labellum and two broad, somewhat rounded petals project above. These often look like donkeys' ears, hence one of their common names. They occur in open forest, near rocky outcrops and winter wet grassland or seasonal swamps, sometimes in large colonies.

Thelymitra crinata
Photo: Jim Hill

Caladenia is a genus of about 200 species with a transcontinental distribution and occurs in two distinct flower forms, those with small flowers with sepals and petals of about the same size with one projecting vertically, two laterally and two downwards behind the labellum. *Caladenia flava* (Cowslip Orchid) is a bright yellow and is endemic and common in WA.

In EA the smaller flowered *Caladenia carnea* (Pink fingers) is endemic and common. Currently the taxonomists list *Caladenia latifolia* as occurring in both EA and WA. The second group of Caladenias are the Spider Orchids with usually larger flowers where the petals and sepals are longer and thinner. *Caladenias dilitata* and *insularis* occur in both WA and EA. The flowers of the Spider Orchids are distinct and often spectacular, in whites, pinks and yellows and are often scented.

Other Caladenia relatives are *Adenochilus*, *Drakaea Chiloglottis*, *Cyanicula*, *Drakonorchis*, *Elyranthera,*and *Glossioda* (Wax Lip Orchid). ***Cyanicula*** was recently separated from Caladenia and comprises the blue small - flowered Caladenias and is endemic to WA. ***Elyranthera***, the Enamel Orchids, have spectacular glossy flowers in pink (*emarginata*) and purple (*brunosis*); this also a WA genus. *Glossioda* is an EA genus with attractive purple, mauve or white flowers.

Pterostylis ingens from a prize winning display at the HOS Plant Show in April 2004

Lyperanthus is another Caledenia relative. There were four species, two which only flowered after bush fires and two without this dependency. The fire dependent species, *nigricans* and *forrestii*, have now been separated into the new genus *Pyrorchis*. *Pyrorchis nigricans* (Red Beaks) occurs in WA and EA and is easy to find only after recent fires.

Calaena (Hammer Orchids) and ***Paracalaena*** (Flying Duck Orchids) can also be shown to have originated from Caladenia and have an interesting trigger mechanism for depositing pollinia on their pollinators' backs.

Some of the largest terrestrial orchids are the ***Prasophyllums*** (Leek Orchids). *P. giganteum* from WA can grow to 4 to 5 feet (120 - 150 cm) with a spike of 50 or so comparatively small flowers. Species of this genus occur in WA and EA. The related Onion Orchids or Mignonette Orchids (***Microtis***) are some of the smallest Australia orchids. I have found *M. atrata* flowering at under 3 inches tall in WA and a related species in SA only slightly taller.

Thelymitra is another widespread genus of about 70 species and contains some of the bluest Australian orchids. The colour range goes from true deep blues through pale blues, pinks, reds and yellows, some with self coloured flowers and others spotted. The spectacular Queen of Sheba Orchid (*T. variegata*) is a south WA species. *Thelymitras* are unusual in that all six petals, including the labellum, are similar in shape. These are

commonly known as Sun Orchids as warmth and sunlight is necessary for some flowers to remain open.

It is sometimes claimed that *Ophrys* are the only orchids to be pollinated by pseudo - copulating wasps. ***Calochilus*** is an Australian genus which is pollinated by pseudo-copulating scollid wasps. There are about 11 species in WA and EA all with dull coloured flowers which have a large hairy labellum, hence the common name of Bearded Orchids. They occur in open forests and heathland.

Corybas (Helmet orchids) have one large leaf from which sprouts a single flower. They are unlike any other Australian orchid and they also have the distinction that one species is the southernmost orchid species, occurring on Macquarie Island in the sub-Antartic. Other species occur in Indonesia and Malaysia.

Pterostylis, the Greenhoods or Snail Orchids, is a large group of over 190 species. It was split into 9 or 10 subgroups and was included in the *Orchidinae*. However recent work by Mark Clements and his colleagues in Canberra has shown that genetically *Pterostylis* is related to the *Spiranthoideae* and a subsequent revision has split this long established group into about one dozen genera. Some of the *Pterostylis* are common and some species are easy to grow. *Pterostylis curta* is easy to obtain in the UK.

There are many other Australian terrestrial orchids and I hope that this brief excursion will inspire you to delve further. There are many good orchid sites. Kings Park and Wireless Hill in Perth are good hunting grounds and further afield in WA, Forrestdale Lakes Nature Reserve and nature reserves further south near Jongaroop are worth exploring. In SA, Padthaway Conservation Park in south east, Kaiserstuhl C.P. near the Barossa Valley and Mt. Remarkable National Park and Alligator Gorge in the Flinders have been fruitful. In Vic, Glenelg National Park on the border with SA, various places along The Great Ocean Road and various sites in Gippsland and the Otways are worth exploring. There are various sites in the Blue Mountains and the Royal National Park both easy to get to from Sydney in NSW. The Australian Native Orchid Society (ANOS) has much good information (web address below).

Good books to start with are Native Orchids of Australia by David L. Jones (Reed Books), a comprehensive if little dated survey; A Field guide to the Orchids of New South Wales and Victoria by Tony Bishop (University of New South Wales Press); The Orchids of Tasmania by David Jones et al. (University of Melbourne Press), and Orchids of South West Australia by Noel Hoffman and Andrew Brown (University of Western Australian Press).

The ANOS publishes The Orchadian and has a good website at www.anos.org.au. Finally if you have several hundred pounds to spare and can find a copy, the long out of print Orchids of Australia by W.H. Nicholls and edited by David Jones and T.B.Muir

(Nelson, 1969) is a mine of information with botanical paintings of most of the then known Australian Orchids.

American Native Orchid Conference
August 7 - 10, 2004

The 3rd annual Native Orchid Conference will by held in Conway, South Carolina with field trips along the coast of the Carolinas. The presentations portion of the conference will be held at Coastal Carolina University on Saturday and Monday (August 7th & 9th) with field trips to local areas along the coast on alternate days of the meetings (August 8th & 10th).

A few of the speakers include Jim Fowler (An Introduction to the Orchids of South Carolina), Alan Weakley (Orchid Habitats of the South-eastern United States), Marilyn Light (Long-Term Study – Conservation Payoff), and Lucy Dueck (The Spiranthes Genetics Project: A Preview).

Registration will be limited to the first 100 people from whom we receive mailed responses. All registration must be done by mail. There will not be any registration at the door. The conference cost is $100 per person or $175 per couple and includes lunch during the two days of meetings at Carolina Coastal University.

During the field trips we expect to see the followings orchids in bloom:
Epidendrum magnoliae (Green Fly Orchid)
Habenaria repens (Water Spider Orchid)
Platanthera blephariglottis var conspicua (Large White Fringed Orchid)
Platanthera ciliaris (Yellow Fringed Orchid)
Platanthera cristata (Yellow Crested Orchid)
Platanthera flava var flava (Southern Rein Orchid)
Platanthera integra (Yellow Fringeless Orchid)

Additionally, there could be an opportunity to see several natural hybrids:

Platanthera x bicolour
Platanthera x chanelli

To obtain further information or registration forms please contact:

David McAdoo, Conference Chairman or Mark Rose, Treasurer
Ph: (336) 996-2324 Ph: (336) 656-7991.

You can also email: ncorchid@yahoo.com

Back issues of HOS Newsletters/Journals.

All copies of the Newsletter/Journal are still available. They can be obtained from the Barry Tattersall, 262, Staines Road, Twickenham, Middlesex, TW2 5AR. Enquiries welcome by email at orchis@tatty.screaming.net

A full list of contents can be viewed on our web site at http://www.hardyorchidsociety.org.uk/

The current cost of back issues of the Newsletter/Journal (members please quote your membership number when ordering) are:

Newsletter - Members - £2.50 per issue or £2 each for 4 or more issues
Non-members - £3.75 per issue or £3 each for 4 or more issues
Journal - Members - £3.50 per issue or £3 each for 4 or more issues
Non-members - £5.25 per issue or £4 each for 4 or more issues

The prices above include the cost of postage for UK orders. For our foreign friends we will have to charge postage at cost.

BBC Wildlife Magazine – June 2004

A charming pocket guide depicting all our native orchids was issued with the June edition of the above popular magazine. Richard Bateman is credited for his help with scientific names.

Editorial Appeal

I hope that members will have enjoyed reading this edition of the HOS Journal. The editor is happy to accept criticisms, comments and suggestions to improve the content and the layout. Technical advice is always welcome as the editor is not an IT expert. Good quality photographs to accompany articles are always welcome, preferably digitised, but slides and prints are also appreciated. Drawings and colour sketches are also welcome. There is a lot of talent in the Society, so it seems a shame not to display it.

Please do not hesitate to contact me with your queries.

Visit the new Hardy Orchid Website

www.hardyorchidsociety.org.uk