

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 to Authors' (see website, January 2004 Journal or contact the Editor).

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Front Cover Photograph

Ghost Orchid *Epipogium aphyllum* var *lacteum* photographed by Robert Thompson in Germany (article on page 22).

Contents

Editorial Note	3
HOS Programme 2006	3
Looking Back - Looking Forward by Tony Hughes	4
Photographic Competition 2005 by Eric Webster	5
The Hardy Orchid Society Seed Bank and You by Philip Seaton	12
Pleione Culture by Maren Talbot	18
Unusual <i>Epipactis</i> on the Cumbrian Limestone by Alan Gendle	20
Chasing Ghosts by John Spencer	22
Aggregate Scores by Richard Manuel	25
<i>Ophrys apifera</i> Fungi by Ted Weeks	26
A Note on the Fly x Bee Hybrids by Robert Kempster	27
Book Reviews	28

Editorial Note

Many thanks to several new contributors for sending in material, some of which is published in this edition. Articles do not need to be a major text to be of interest! Also, I would like to thank Robert Thompson for the stunning cover shot. Members might be interested in Robert's work and excellent books on nature photography (see www.robertthompsonphotography.com).

HOS Programme 2006

Meetings

Sunday 30th April: Spring Meeting (including AGM and Plant Show) at Exeter Hall, Kidlington. Contact Roger Gelder, roger.gelder@ntlworld.com.

Saturday 9th September: Northern Meeting at Harlow Carr, Harrogate. Contact Tony Hughes, tel. 01886 832647, tonyhughes3@btinternet.com.

Sunday 12th November: Autumn Meeting (including Photographic Competition) at RHS Wisley. Contact Maren Talbot, mtalbot@onetel.com.

Field Trips

Sunday 23rd April: Purbeck for Early Spider Orchid, and Poole Harbour for Dartford Warbler. Contact Norman Heywood, nandaatngf@supanet.com.

Sunday 21st May: Three Chiltern reserves for *O. militaris*, *O. simia*, *O. purpurea* and *Op. insectifera*. Contact Malcolm Brownsword, tel. 01235 850668 or malcolm.brownsword@tesco.net.

Sunday 18th June: Box Hill, Surrey for *O. anthropophora*, *Herminium monorchis*, *D. viridis*, *Op.apifera*, *Neottia nidus-avis*. Contact David Slimming, audrey.slimming1@btinternet.com.

Please Note that all field trips are limited to a maximum of 15, so please book early through the nominated contact. Any general questions about field trips to David Hughes cchughes1@waitrose.com or tel. 01425 470464. We hope to arrange an additional field trip in East Anglia at the end of May or early June (Contact Mike Gasson moorend@globalnet.co.uk). Also, a volunteer to organise a field trip somewhere in the north of Britain would be especially welcome (please contact David Hughes). Confirmation of field trips and full details will be provided in the April 2006 Journal.

HOS Displays

18th to 19th March: London International Orchid Show, RHS Halls, Vincent Square.

30th April to 1st May: Raby Castle Orchid Show, Staindrop, Co. Durham.

Contact Maren Talbot mtalbot@onetel.com to enquire about displays. Maren will be very grateful to receive offers of plant contributions for Raby Castle.

Looking Back - Looking Forward Tony Hughes

2005 proved to be yet another good year for the HOS and its members, with a full calendar of events. We started with the AGM, Spring Meeting and Plant Show in April, already fully reported in the July Journal. Field trips then kept us busy over the summer, with much appreciated visits to South Dorset, East Kent and South Cumbria - our thanks go to all the willing leaders. The Northern Meeting at Harlow Carr was a most enjoyable event - what a pity there were only about 40 members present! Perhaps some of our "northern" members would let us know how we might make next year's meeting more attractive? By contrast the Autumn Meeting at Wisley was almost a sell out, with good lectures and probably our best-ever Photo Show. An innovation at the last two meetings was a raffle, ably run by Chris and Lorraine Birchall, which has given a significant boost to our "capital equipment" fund. Telling the world about our society remains a priority, and we are most grateful to Bill Temple for his work on the HOS Website, and to Maren Talbot and her helpers for mounting HOS displays at the Raby Castle Orchid Fair in County Durham and at the Newbury Orchid Show. And throughout the year our Journal has gone from strength to strength, with even higher quality colour pictures achieved by our new printer.

For 2006 the planned programme of events is much as before - why change a successful recipe? But we won't be complacent - thanks to the good response to last year's Questionnaire, the Committee now has a better idea of what you, the members, want, and will hope to satisfy at least some of your desires. David Hughes is co-ordinating an expanded programme of Field Trips, giving us even more opportunities to visit our favourite plants in the wild. It has also been suggested that we might introduce "5 Slides in 5 Minutes" slots at our meetings, to broaden the scope of each meeting and to allow more people to entertain us. If you can think of something suitable, whether it is an interesting hybrid, a good place to visit, a strange anomaly, a new cultivation technique, or anything else of interest, please let me know. Finally, I would like to wish you all an enjoyable year in whatever aspects of the HOS appeal to you, and to encourage you to provide me and the Committee with your ideas and feed-back.

Photographic Competition 2005

Eric Webster

This year's entries proved to be some of the best ever, and the photographic expertise was obvious. There were 26 exhibitors who presented an outstanding total of 210 entries, 152 prints and 58 slides which impressed the judge, John Jones ARPS. John is an authority on British wild orchids, and an expert photographer who is renowned nationally for his judging of photographic competitions. He gave a presentation after lunch and offered a great deal of helpful photographic advice to the members.

All the exhibitors must be thanked for their contributions to the show, especially as many of us had a bad journey with M25 problems. As always good HOS members can't be held down, and everyone turned up to make the day a very pleasant one. The Judge must also be thanked for re-judging the competition when we had five or six members arrive late because of the M25 saga. This was a very unusual situation, and I thank John very much for the extra work he put in by doing this. I would also like to praise all the exhibitors who were on time for being sporting enough to agree to this.

At this stage I would like to impress upon you the benefits of submitting entries by e-mail or telephone prior to the show day. Then you can walk in with your prints, pick up your cards, and stage your exhibits in 5 minutes. The alternative is to join a queue waiting for their entries to be recorded and cards to be written, which can take 30 minutes. Once again, thanks to John Jones, all the exhibitors, Barry Tattersall who once again accepted entries by post, and Neil Hubbard who helped in the Show Hall. Do not forget if you can take an interesting photograph, everyone will enjoy seeing it whether it is a winner or not.

Photographic Competition Winners

Class 1 An orchidaceous landscape, print up to 7x5 (10 entries)

1st David Hughes:- Cumbrian landscape with *Dactylorhiza purpurella*, *D. maculata* and hybrids.

2nd Alan Blackman:- A woodland in Kent.

3rd Patrick Marks:- Heath Spotted Orchid (*Dactylorhiza maculata*) near Ullapool.

Class 2 A group of orchids, print up to 7x5 (13 entries)

1st Alan Gendle:- Sawfly Orchid (*Ophrys tenthredinifera*).

2nd John Wallington:- Man Orchids (*Orchis anthropophora*) at Sandwich.

3rd Mike Gasson:- Military Orchids (*Orchis militaris*) in Suffolk.

Class 3 A single orchid plant, print up to 7x5 (14 entries)

1st Simon Andrew:- Small White Orchid (*Pseudorchis albida*).

2nd John Wallington:- Man Orchid (*Orchis anthropophora*) in Sardinia.

3rd Alan Gendle:- *Ophrys apulica*.

Class 4 A close up, print up to 7x5 (28 entries)

1st John Wallington:- Monkey Orchid (*Orchis simia*) in Kent.

2nd Ian Robertson:- *Anacamptis papilionacea* in Corsica.

3rd Mike Gasson:- Military Orchid (*Orchis militaris*) in Suffolk.

Class 5 An orchidaceous landscape, print up to A4 (10 entries)

1st Simon Andrew:- Green Winged Orchid (*Anacamptis morio*).

2nd John Wallington:- *Orchis italica* on a Cyprus hillside.

3rd Tony Heys:- Common Spotted Orchid (*Dactylorhiza fuchsii*), South Downs.

Class 6 A group of orchids, print up to A4 (17 entries)

1st Simon Andrew:- Military Orchid (*Orchis militaris*).

2nd Richard Manuel:- Green Winged Orchid (*Anacamptis morio*).

3rd Ron Harrison:- Hybrid *Dactylorhiza incarnata* x *D. purpurella* in Cumbria.

Class 7 A single orchid plant, print up to A4 (15 entries)

1st Bill Temple:- *Gymnadenia (Nigritella) lithopolitanica*.

2nd Don Tait:- Fen Orchid (*Liparis loeselii*).

3rd Alan Gendle:- Dark Red Helleborine (*Epipactis atrorubens*).

Class 8 A close-up, print up to A4 (45 entries)

1st Graham Giles:- Common Spotted Orchid (*Dactylorhiza fuchsii*).

2nd Simon Andrew:- *Platanthera praeclara*.

3rd Patrick Marks:- Military Orchid (*Orchis militaris*).

Class 9 An orchidaceous landscape, 35mm colour slide (9 entries)

1st Peter Mottershead:- *Dactylorhiza majalis*.

2nd Tony Hughes:- *Anacamptis papilionacea* in Andalucia.

3rd Graham Giles:- Common Spotted Orchid (*Dactylorhiza fuchsii*).

Class 10 A group of orchids, 35mm colour slide (16 entries)

1st Patrick Marks:- *Cypripedium reginae*.

2nd Tony Hughes:- Green Winged Orchid (*Anacamptis morio*).

3rd= Peter Mottershead:- Burnt Orchid (*Neotinia ustulata*).

3rd= Graham Giles:- Burnt Orchid (*Neotinia ustulata*).

Class 11 A single orchid plant, 35mm colour slide (13 entries)

1st Ian Robertson:- *Dactylorhiza romana*.

2nd Alan Gendle:- *Dactylorhiza purpurella* var. *atrata*.

3rd Peter Mottershead:- *Serapias neglecta*.

Class 12 A close-up, 35mm colour slide (18 entries)

1st Richard Manuel:- *Satyrium nepalense*.

2nd Rosemary Webb:- Autumn Lady's Tresses (*Spiranthes spiralis*).

3rd Nigel Johnson:- Greater Butterfly Orchid (*Platanthera chlorantha*).

The following were commended by the judge:

Class 2: Alan Gendle:- *Ophrys scolopax*; Mike Gasson:- *Orchis mascula*.

Class 4: John Wallington:- *Dactylorhiza sambucina*; Alan Gendle:- *Dactylorhiza maculata* x *Gymnadenia borealis*.

Class 5: Simon Andrew:- *Dactylorhiza fuchsii*.

Class 6: Simon Andrew:- *Cypripedium calceolus*.

Class 8: Ron Harrison:- *Dactylorhiza incarnata* subsp. *pulchella*; Tony Heys:- *Anacamptis pyramidalis*; Neil Hubbard:- *Dactylorhiza maculata*; Mike Gasson:- *Orchis militaris*; Simon Andrew:- *Dactylorhiza incarnata*; Richard Manuel:- *Himantoglossum hircinum*; Patrick Marks:- *Orchis simia*; Patrick Marks:- *Orchis simia* and beetle.

Winning Photographs

The following four pages carry the first place photographs from all 12 Classes. They can be identified by the small number at the top left of each plate. This number matches the class (i.e. 1 represents the winner in Class 1 etc). The one exception is Plate 13, which is the second place photograph in Class 12. Rosemary Webb's *Spiranthes spiralis* was chosen as the judge's personal favorite, and joins the first placed photographs in the 'gallery of honour'.

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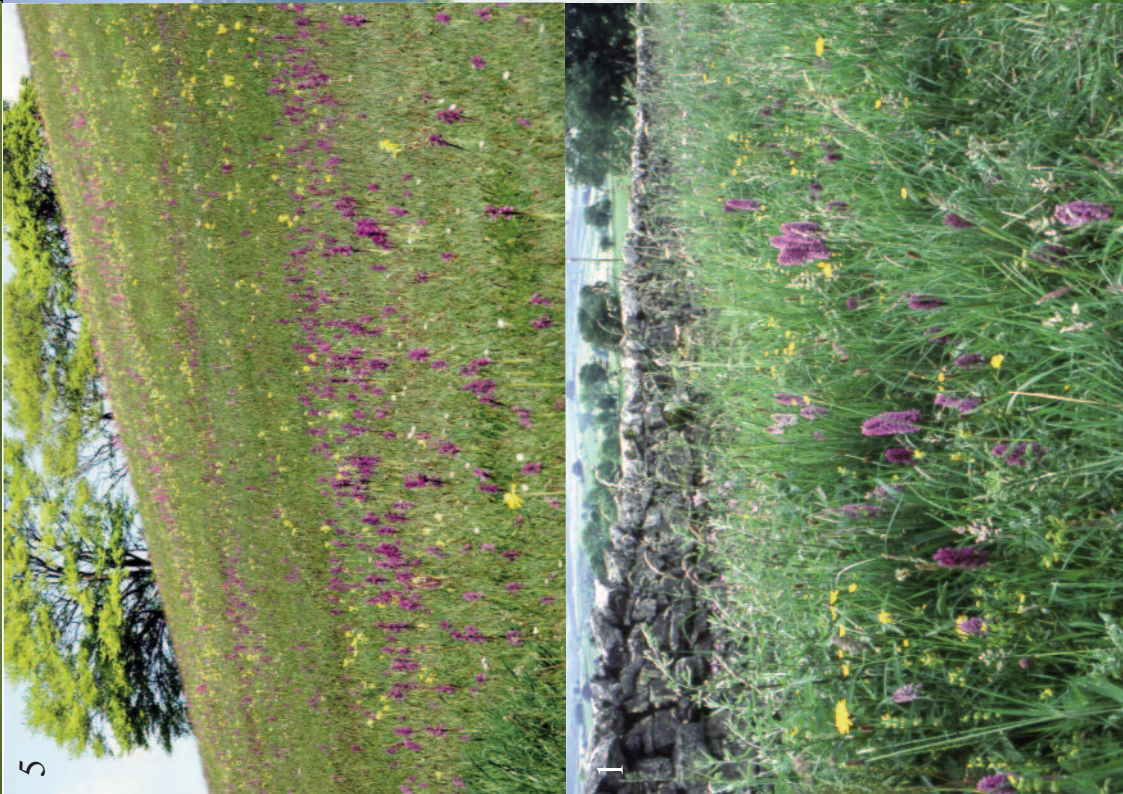


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The Hardy Orchid Society Seed Bank and You

Philip Seaton's Talk at Harlow Carr

A word about seeds in general

Encapsulated in a protective envelope (the testa), a typical seed consists of a miniature, embryo plant, either containing or nestling alongside a food reserve that can be made available when conditions favour germination. Seeds such as peas and beans are packed full of starch that can be rapidly broken down into sugars, whereas sunflower seeds are rich in high energy oils. Most (but not all) seeds can be dried to somewhere around 5 or 6% moisture content, indeed one could say that they are designed to be dried to such low moisture content. Drying prevents ice crystal formation at sub-zero temperatures, and thereby the cell damage that can result. This means that dry seeds can be stored at sub-zero temperatures. Such seeds are referred to as being orthodox.

Are orchid seeds different?

Well yes, we all know that orchid seeds are different from either of the above. They are tiny, weighing no more than a few micrograms. They are transported on the merest breath of air. Instead of an embryo with clearly defined beginnings of shoot and root, there is a tiny ill defined ball of cells. The security of a food reserve has been sacrificed in favour of miniaturisation, and the chance of a potentially dangerous liaison with a compatible fungus to achieve germination. How members of the *Orchidaceae* evolved such a risky strategy is perhaps a mystery, but certainly the sheer number of species testifies to the family's success.

However, from a storage point of view the question is: "Are they orthodox?" Happily the answer is a resounding yes! There are a few minor differences in their behaviour from typical orthodox seeds at some sub-zero temperatures (around -30 to -50°C); these temperatures are, however, easily avoided, and dry orchid seed can be stored happily at either 5°C (the temperature of a domestic refrigerator), or -20°C (the temperature of your deep freeze).

How long can orchid seeds be stored?

Despite Lewis Knudson's findings in the 1950's that dry seeds of at least some orchid species could be stored for at least 20 years at refrigerator temperatures, the view has

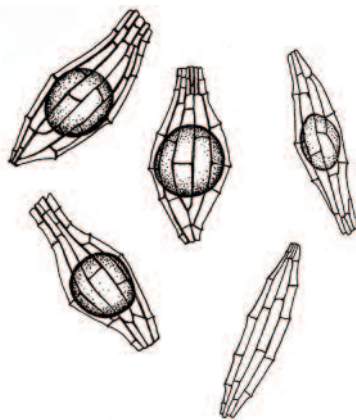


Figure 1 Viable (spherical embryo), non-viable (small embryo), and empty seeds

persisted in some circles that orchid seeds are short-lived. Detailed research over the past thirty years has, however, confirmed that orchid seeds are no more short-lived than seeds of some other plant families and, as far as we can tell, most should remain viable for decades at least when stored dry and at low temperatures.

Seed collection and seed quality

The first step in any seed storage project must be the collection of good quality seed. Put simply, you could not reasonably expect poor quality seed to maintain high levels of viability for as long as good quality seed. Quality depends upon a number of variables. These include timing of harvest, parentage, and environmental conditions during maturation of the seed capsule. Although sowing of immature embryos (so-called 'green pod' techniques) has advantages in terms of reducing the time a capsule is carried by the parent plant, and avoiding problems of surface-sterilization of seeds during the sowing procedure, the likelihood is that such seed cannot be stored as successfully as mature seed. As seeds mature within the capsule they gradually acquire the ability to survive drying, particularly towards the end of the maturation process. Drying is a key component of successful orchid seed storage. Seed is therefore best harvested at, or just prior to, splitting of the seed capsule.

Once harvested, seeds should be examined to check their viability. There is no point storing dead or empty seed. Ideally a sample can be examined under low magnification using a microscope, but a x10 hand lens will often be sufficient for at least a cursory examination. Potentially viable seed can be recognised by the presence of a plump embryo. Although this is, in itself, no guarantee that the seed will germinate (it may require a special medium or a compatible symbiotic fungus or, in some instances, a dormancy-breaking procedure) the presence of such an embryo in freshly harvested seeds generally suggests the seed is viable. In addition to the obviously full embryos, some seed coats will house somewhat reduced embryos. Others will contain no embryos at all (Figure 1).

The importance of seed moisture content

I'm hoping that, by now, you have noticed that I keep referring to 'dry seed'. Whereas most people appreciate the advantages of storing at low temperatures almost intuitively, the same does not appear to be true for reduced moisture content. Yet the benefits of reducing seed moisture content are, if anything, greater than those of reducing seed storage temperature. At one extreme, moist seed will support the growth of fungal and bacterial spores, which will grow rapidly and kill the embryo. In addition, infected seed soon become almost impossible to sterilize and to sow in a sterile flask without contamination. At the other end of the spectrum, life processes depend on the presence of moisture. Thus, reducing seed moisture content to the extreme can dramatically shorten life-spans. Removing moisture entirely will result in the death of embryos.

Drying seed to a suitable Moisture content

The aim is to obtain a seed moisture content as close to the optimum as is practical (neither too high, nor not too low). If placed in a humid atmosphere, seed will gradually absorb moisture. Likewise, in a dry atmosphere seed will lose water to the air. In either case, over a period of time, the seed and the atmosphere will reach an equilibrium at which point moisture is neither lost nor gained. The seed will have achieved its equilibrium moisture content.

Where basic laboratory facilities are available, a saturated solution of calcium chloride is recommended (lithium chloride might be even better, but there may be problems with availability). A saturated solution of calcium chloride gives a relative humidity around 30% at 20°C, and seed moisture content of 4 to 6%. The saturated solution should occupy at least one quarter of the volume of the desiccator. As long as some undissolved salt remains in the solution, the relative humidity will remain constant whilst the container remains at that temperature (Figure 2).

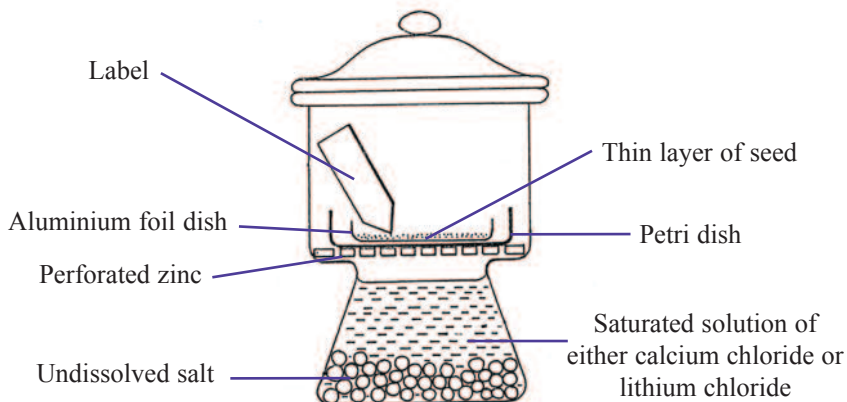


Figure 2 Desiccator with seed equilibrating over a saturated salt solution

An alternative desiccant

For the amateur grower who may have difficulty obtaining calcium chloride, dried rice is a suitable alternative. When this was first suggested, I was intrigued. Then I remembered that my grandmother always used to place a few grains of rice in the salt cellar to keep it free-flowing. Table salt is hygroscopic, that is to say that it takes up moisture from the atmosphere and the rice (when dry), in turn, is used to absorb the moisture from the salt. It may seem strange to use one seed to dry another, but toasted rice has been used as a desiccant for a wide range of both temperate and tropical seeds. Any supermarket brand will do. Simply spread the rice as a thin layer in the bottom of a baking tray, and dry in the oven at around 100°C overnight. It is

important to remember that it requires regular regeneration as, with repeated use, it will itself gradually become increasingly moist. The drying capacity (i.e. how much moisture it is capable of absorbing) of rice is also generally unknown, so you should use plenty of it, filling the desiccator at least three quarters full of dried rice (Figure 3). Once dried, the seed should be placed in a sealed container.

A word about silica gel

The use of silica gel as a desiccant is particularly appealing because it is normally purchased incorporating cobalt chloride as an indicator, which turns from blue to pink when it is moist and in need of regeneration. The use of cobalt chloride as an indicator is being phased out due to the toxicity of cobalt. As an alternative, it is now possible to purchase 'Silica Orange'. A potentially serious problem, however, with using dry silica gel as a desiccant is that it can produce very low moisture content indeed: so low that they are potentially damaging to the embryo and actually reduce seed longevity. The use of silica gel as a desiccant is not recommended for long term storage, although its use for short-term storage may be acceptable.

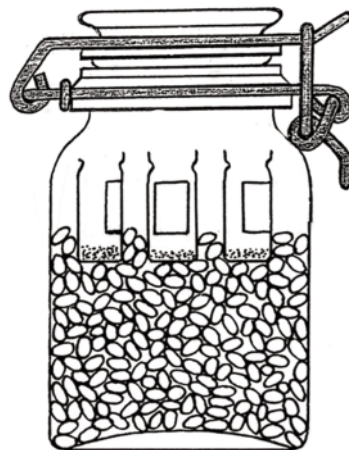


Figure 3 Seed equilibrating over dried rice

Storage temperature

The fact that reducing storage temperature improves seed longevity is widely appreciated. Good quality (high initial germination) orchid seed, stored in airtight vessels at a suitable seed moisture content, will maintain its viability at a temperature of 5°C in a domestic refrigerator for many years. Further reducing storage temperature from refrigerator temperature to the temperature of a domestic freezer (-18 to -20°C) leads to additional increases in seed longevity.

Storage containers

The responses above suggest that orchid seeds behave much like seeds of other plant families, in relation to drying and temperature reduction. The next question becomes what is the most suitable container? Many people store seeds in paper envelopes. Waxed paper will not take up moisture, and the seed does not stick to it. For long periods of storage (a number of years), hermetically sealed tubes are preferable. Glass tubes are preferable to plastic (where seeds tend to adhere to the sides of the tubes). Seeds should be stored in tubes with a volume that provides a minimum of headspace above the seeds (Figure 4). Keeping the volume of air in the headspace

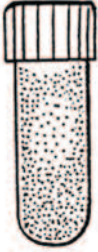


Fig. 4 Tube of seed

to a minimum, when compared to the volume occupied by the seeds, means that the seeds will completely dominate the system. This avoids the potential problem of seeds equilibrating to a new and different moisture content within the storage tube during transfer of that tube to the storage room or facility. If the volume of air is kept to a minimum then the moisture within the seed will overwhelm any effect of the moisture content of the surrounding atmosphere.

A potential problem arises with the long-term integrity of any seal. Storage jars, with their combination of a natural rubber seal and a clamp have been demonstrated to be the best available option by the Millennium Seed Bank Project (MSBP) at Kew, where the additional precaution is taken of renewing the seals at ten year intervals. Tubes can be stored within storage jars (Figure 5). After equilibration to a suitable moisture content, seeds are placed within hermetically-sealed tubes. Sachets of blue silica gel can be included to act as an indicator (not as a desiccant) of the performance of seals if any air leaks occur. The aim is to enable us to judge if moist air is leaking past the seal into the jar. If it is, the seed should be re-dried and the seal should be replaced. If seeds are being stored in paper packets, a practical (but short-term) alternative, the packets should be kept in a suitable air-tight jar (Figure 6).

Labelling and record keeping

Good record keeping is vital. It is important to label everything at the outset to avoid any possibility of mix-ups. Tubes, packets and jars should all be labelled and dated, and details kept in a note-book and/or on a computer spreadsheet.

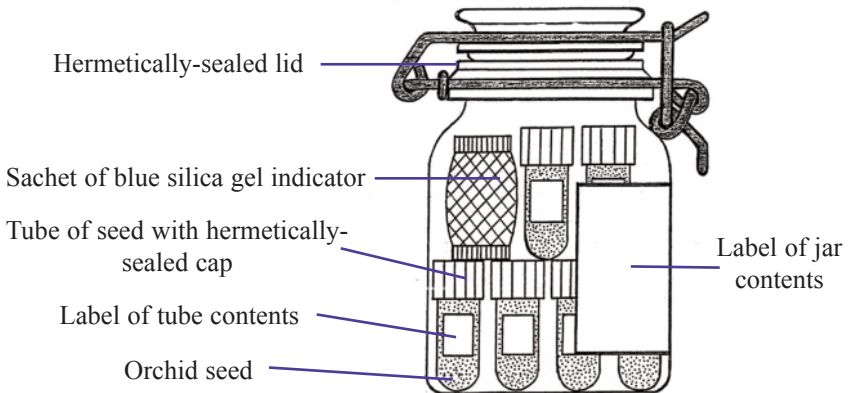


Figure 5 Tubes of dried seed stored in a hermetically sealed jar

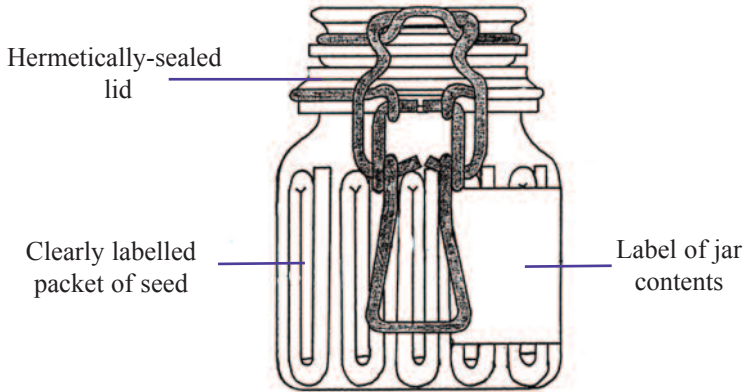


Figure 6 Packets of dried seed stored in a hermetically sealed jar

Withdrawing seed samples

Every time a tube of seeds is opened the seed will begin to re-equilibrate with the moisture in the atmosphere. There is a choice to be made between re-equilibrating the remainder of the seed lot over an appropriate constant humidity solution before returning to storage, or storing seed lots in a number of individual tubes which will be opened once only. If the intention is to remove seed samples for sowing at regular intervals, the latter option may be the most appropriate, as long as the seed lot is thoroughly mixed at the start to ensure that, as far as possible, each tube is representative of the whole seed lot.

Using the Seed Bank

Broadly speaking, there are two main types of seed bank: long-term seed banks, where the material remains untouched in storage for many years; and active seed banks, where accessions are withdrawn at regular intervals. Ours is definitely an active seed bank and, personally, I would like to see more people take advantage of the seed stored therein.

When an accession is withdrawn we ought to be able to say two things about the seed lot. First, we should be able to say that the seed is viable. Obviously there is no point in sending out dead seed, and indeed there may be little point if the viability is very low. Second, we should say what medium the seed can be germinated on. After all, different media may give different percentage germinations. All media are not equally suitable for all species. This implies that there will be much more information sharing about suitable germination media between members and between those operating the seed bank.

Correct identification of the donated seed

This is a bit of a thorny one. There is no way that the seed bank manager (i.e. me, at the moment) can know if the donated seed has been correctly identified. It can be a long time between germination and flowering, only to find that the species is not what you were led to believe. One solution would be to submit a good quality photograph of a flower, and perhaps one of the whole plant in flower too. Happily, digital photography and scanners make it relatively easy to include such information in a database.

Donating and sending seed through the post

Seed should be sent to the seed bank manager as soon as possible after it has been harvested. This is especially important if you are not going to dry it first (although I hope that you would). I would prefer not to receive seed capsules, as the seed can rapidly become contaminated. Seed in paper envelopes is fine. However, franking machines are death to orchid seeds; they simply mash them to pieces. Seed should be sent within some sort of crush-proof container. It doesn't have to be fancy; something reasonably sturdy inside a padded envelope is good.

A database

All of which leads me on nicely to the last point. All the above information needs to be recorded on a suitable database. Species, photograph, provenance, name of donor, date of harvest, date of receipt, percentage germination upon receipt, medium used to germinate the seed - all need to be recorded for future access.

Acknowledgement

All diagrams produced with the kind permission of the Royal Botanic Gardens, Kew. Copyright Philip Seaton.

Pleione Culture Maren Talbot's Talk at Wisley

Pleiones are small terrestrial and semi-epiphytic orchids with large but delicate flowers, and some are fragrant. By choosing the right varieties, they can be had in flower for nine months of the year. They originate from China, Bhutan, Nepal, India and Taiwan, where most grow at elevations between 800 and 2800m. The Victorians called them "Window Sill Orchids", because they used to thrive on the window sills of unheated rooms.

Pleiones have pseudobulbs, they are deciduous, mostly cool growing and all require a dry winter rest. In nature, they occur in neutral to slightly acidic substrates:



Illustration by the late Barbara Everard

Terrestrials thrive in leaf litter of rhododendron leaves, pine needles, and other ericaceous shrubs. They include many of the Chinese species, such as *Pleione yunnanensis*, *Pln. bulbocodioides*, *Pln. formosana*, *Pln. limprichtii*, *Pln. pleionoides* and *Pln. scopulorum*.

Epiphytes nestle in moss on branches or trunks of trees in montane forests and woods. They grow at a range of heights, and include *Pleione coronaria*, *Pln. praecox*, *Pln. maculata* and *Pln. humilis*.

Most Pleiones are spring flowering, which means at the beginning of the growth cycle. Those that are have one leaf (except *Pln. scopulorum*). Some are autumn flowering, i.e. at the end of the growth cycle. They tend to have two leaves and include *Pln. maculata*, *Pln. praecox*, and *Pln. vietnamensis*. Some require warmer temperatures e.g. *Pln. maculata* (min 13°C).

The growth cycle for spring flowering types of *Pleione* can be summarised thus:

December – January	Buy dormant bulbs; dry cool winter rest (min temp 2°C)
January – February	Pot up, min temp 2°C, no water
March: new growth, flower buds and flowers	Start to water very sparingly until roots develop, light shade
April – June: flowers begin to fade	Water liberally, feed (¼ strength) N2:P1:K1 to promote leaf growth
June – August: Major period of leaf growth	Water liberally, feed (¼ strength) N1:P1:K2 to promote bulb maturity
September onwards: leaves turn yellow	Reduce watering, stop feeding
October onwards: leaves turn brown and fall	Stop watering, clean, rest, re-pot

Unusual *Epipactis* on the Cumbrian Limestone

Alan Gendle

A band of carboniferous limestone stretches across south Cumbria, as far as the Yorkshire borders around Ingleborough. It appears in the form of screes, crags and limestone pavements and provided some interesting *Epipactis* discoveries last year that are described in this article. My exploration of the area was prompted by Barry Tattersall's photographs of the hybrid *Epipactis atrorubens* x *helleborine* (*Epipactis xschmalhousenii* K Ritcher), which he had found on the south Cumbria pavements some years previously. Photographs of the plant now feature on pages 83 & 84 of "Orchids of the British Isles" (Foley & Clarke, 2005). I decided to try and find similar hybrids in the areas where I knew the Broad Leaved Helleborine (*E. helleborine*) and the Dark Red Helleborine (*E. atrorubens*) grow together.

My first search on the 17th July was an area of limestone escarpment to the west of Kendal. The summit plateau supports populations of *Ophrys insectifera*, *Gymnadenia borealis* and *Platanthera bifolia*. Along the western edge a gap in the line of crags allows access to an area of steep screes where a population of *E. atrorubens* was in flower along with a few *Gymnadenia conopsea*. Unfortunately, all the *E. helleborine* plants had been browsed by deer.

After struggling up the scree I explored the crags as I returned towards the car. A strange plant caught my eye on the side of a steep crag. It looked like *E. atrorubens*, but although the sepals and petals were a near normal colour, the labellum was a distinctive buff colour. Having climbed out onto the top of the cliffs a few minutes later I saw another *Epipactis atrorubens*, and this plant had flowers that were a delicate lemon yellow colour. This turned out to be *E. atrorubens* var. *lutescens* (Coss & Germ), as confirmed by Prof John Richards the BSBI *Epipactis* referee. In his books, the late D. M. Turner Ettliger (1997, 1998) states that it has been recorded in the Burren, but no mention is made of any mainland sites. The name appears to be contentious. Richard



E. atrorubens with a buff-coloured labellum



Lemon yellow flowered
E. atrorubens var. *lutescens*

Bateman informs me that it is not on the International Plant Names Index, and I could not find any reference to it in the NHM Botany Library during a recent visit. If any members can throw any light on the subject I would be delighted to hear from them.

On the 22nd July, in the company of Dr. Graham Matthews, a local orchid expert, and some other friends, we set off to search for hybrids on an area of crags where Barry Tattersall's previously mentioned *Epipactis* hybrid had been found. Sadly, it has not been seen in flower over the last two years and I failed to find it at the location given to me by Barry this year. We reached an area of limestone pavements to the southwest of the site of the original hybrid. Exploring the pavements we observed lots of *Epipactis atrorubens* in flower in the shallower grikes; the deeper grikes were home to the *Epipactis helleborine*, which were just starting to flower. At the east end of the pavement we located our first *Epipactis* hybrid. The leaves were characteristic of *E. helleborine* in shape and location, but the labellum displayed an intermediate structure. Further searching produced another hybrid spike about 20 metres away and on a subsequent visit to the area I located what I believe was a third hybrid, but sadly it had gone over.

References

Foley, M. & Clark, S. (2005) *The Orchids of the British Isles*. 390pp Griffin Press, Cheltenham.

Turner Ettliger, D.M. (1997) *Notes on British and Irish Orchids*. 161p Published privately.

Turner Ettliger, D.M. (1998) *Illustrations of British and Irish Orchids*. 216p Published privately.



Parents and hybrid *Epipactis* in Cumbria: Dark Red Helleborine, *E. atrorubens* (left); Broad Leaved Helleborine, *E. helleborine* (right); their hybrid (centre).

Chasing Ghosts John Spencer

It was in 1986 when I last saw *Epipogium aphyllum* in a Buckinghamshire wood, and so it was with some anticipation that I boarded an Easyjet flight from Stanstead to Basle on the 25th of July 2005. With me were Mike Parsons and Robert Thompson, and on arrival our hire car took us into Germany and east in the direction of Hufingen. That evening we found an inexpensive Gasthaus at the village of Mundelfingen. Unaware of our true intention, the locals suggested that we visit “The Orchid Wood”.

This is a notoriously damp part of Germany and the following morning we awoke to drizzle which, thankfully, quickly abated. The sky brightened but we were spared direct sunshine. Also, there was almost no wind, providing ideal conditions for photography.

The Ghost Orchids occur at a number of locations in the wood and, when they do, they appear in numbers. Our timing was spot on and we saw about 500 flowering spikes. The vigour of the stronger rhizomes was amazing. One rhizome could generate 20 flowering spikes and each spike could carry up to seven flowers. The amount of pink on the lip was variable. Indeed, we managed to locate some plants in which it was completely absent. This “var *lacteum*” is a challenge to photograph, since it is very easy to overexpose such a white plant (see front cover photograph).

At the best area we found plants growing under Norway Spruce on a damp forest floor containing only pine needles, decaying wood and the occasional *Melampyrum pratense* (Common Cow-wheat). Normally flash photography was essential, but the stands of trees were interrupted by narrow access paths which made it possible to do long exposure photos of some plants without flash. Mike, on his fourth visit to the wood, confirmed that the plants were taller than usual. We saw one spike, growing within an old tree stump, and it was 24 cm tall.

Most of the earlier species of orchid, includ-



Epipogium aphyllum

Photo by Robert Thompson

ing *Cypripedium calceolus* (Lady's Slipper Orchid) had gone over, but a range of *Epipactis* could be found throughout the wood. Most of the *E. atrorubens* had gone over, but *E. muelleri* was in full flower, as was *E. helleborine*, and the interesting *E. neglecta* was coming out. Nearer the road we saw some impressive Parasol Mushrooms emerging with caps nearly a foot across. They indicated just how damp the wood still was in high summer. Perhaps a traditional English summer with plenty of rain might benefit ghost hunters back home.

It was easy to lose sight of the fact that the wood contained a wealth of other plants including *Aconitum vulparia* (Wolfsbane), *Monotropa hypopitys* (Yellow Bird's-nest), *Prunella grandiflora* (Large Selfheal) and *Gentiana cruciata* (Cross Gentian).

Tearing ourselves away from the wood, we headed south and spent the following night in Austria on our way to Italy and the Dolomites. The next day we took a minor road south of Brunico, to San Vigilio di Marebbe and then uphill to Rifugio Pederu beyond which public driving is banned. From the Refuge I walked 7 km up the old military road to Lago de Piciodel, where I was delighted to see my first *Gymnadenia odoratissima* growing with *E. atrorubens*. Jeep-taxis are allowed to operate in the Parco Naturale Fanes Senes Braies, and the others took advantage of this to get to the alpine slopes near Lago de Limo at 2120 m. Here they did well to find several *Chamorchis alpina* and a solitary late *G. austriaca* (for those more familiar with the old taxonomy, *Gymnadenia* does of course replace both *Nigritella* and *Pseudorchis*). That evening we found a charming chalet



Epipogium aphyllum

Photo by Robert Thompson



Chamorchis alpina

Photo by Robert Thompson

type hotel back at San Vigilio where we stayed for the next two nights. By not pre-booking any of our accommodation we were able to follow an impromptu schedule.

The following day we saw *G. rhellicani*, *G. dolomitensis*, *G. albida* and *G. densiflora* near Passo di Falzarego. Also in flower were *Dactylorhiza alpestris*, *D. cruenta* and *D. lapponica*. On our third and last day in the Dolomites we took the cable car up from Madonna di Campiglio to the Burren-like landscape near the top Groste Station. Here we saw *G. rhellicani*, *G. odoratissima* and the hybrid between them. Initially, all the *G. buschmanniae* we found had already gone over, but, after much searching, Mike was successful in locating a plant in full flower.

It must be said that the majority of the *Gymnadenia* we saw had finished flowering. One would probably do better by pairing a trip to Germany, for the Ghost orchids, with a visit to the Alps in Austria, for the *Gymnadenia*.

We drove across the flat North Italian plain and, after an overnight stop at Brescia, crossed into France and stopped at Lac du Mont Cenis. Plodding uphill from the lake we disturbed clouds of Queen of Spain Fritillaries and Robert was pleased to see Wart-biter Crickets - such a rarity in England. The rich alpine flora included *Gymnadenia rhellicani* var *robusta* (formerly *G. cenisia*), a big plant, along with *G. rhellicani*, *G. albida*, *Dactylorhiza viridis* and *Platanthera chlorantha*. The nearby Col de l'Iseran is a late area and on the climb up we saw *G. odoratissima* in bud and fresh *D. alpestris*.

On our last orchiding day, we visited a Ghost Orchid site near Sallanches, but the wood in question was very dry and we drew a blank, a real contrast with Germany. Finally, we traversed Switzerland to bring us back to Basle for our flight home.



Epipogium aphyllum var *lacteum*

Photo by John Spencer



Gymnadenia dolomitensis

Photo by John Spencer

Aggregate Scores **Richard Manuel**

I often think about terrestrial orchid composts - I've been doing so for nearly 30 years in fact, which probably accounts for the condition of my brain! Many of the ingredients, particularly the organic ones (loams, leafmould, bark products, etc), are difficult to quantify, which I won't attempt here. I'll just point out that over the course of time, typically one growing season, which is less than a year, they all break down to what is effectively, mud. The inorganics fall neatly into two categories, natural (gravels, grits, and sands, which are to all effects impermeable, although the smaller particles retain some water by capillarity between the grains) and man-made, usually clay aggregates (see Table 1 below) which, apart from contributing to the structure of the compost, also affect a compost by the amount of water, if any, they retain by porosity. The main purpose of all these inorganic substances (all granular) is in defining the structure of a compost, by forming a sort of fixed matrix within which the organic bits and pieces gradually decompose. Without them the organic components would compact and reduce to a smelly slush in a few months. Yet if a compost consists of, say, 80% grit and 20% organics (as a typical *Cypripedium* compost might) it could dry out too quickly, and endanger its inhabitants by desiccation.

The man-made inorganics have often had sweeping assumptions made about them, but I have never seen a sensible attempt to demonstrate what they do. This is rather surprising in view of the amount that is written about composts, especially for *Cypripediums*. So here is a crude attempt to quantify the water-holding qualities of a random selection of materials (simply what I had kicking around at the time) but they do cover most of those that are often used. I have ignored horticultural Vermiculite and water-retentive gels, which are used only to add to the water retention of a compost, and contribute little to the structure.

Hydroton is a German product used for hydroponic culture, but it is available locally. It consists of roughly spherical baked clay pellets. Hortag is similar. For comparison, I have included pumice, which is a more or less natural product, crushed and screened. It is often extolled as the essential ingredient in *Cypripedium* composts. The top three materials are all about the same particle size, 5 to 8 mm, whilst Seramis and Perlite are smaller but similar to each other in size. The drained wet weight (² in Table 1) was obtained by immersing 25 g (dry) of each product in water for five minutes, draining in a flour sieve for a further five minutes, then re-weighing on a chemical balance accurate to 0.01 g (although the results have been rounded down). I have assumed that 1ml of water still weighs 1 g; and I hope the maths is reasonably accurate! Table 1 shows water retention calculated on the basis of material weight³ and material volume⁴. I believe the latter to be the more significant.

I make no judgements here about the suitability of any of these products, but it does seem that the top three materials have a very similar performance and are probably interchangeable. Pumice is slightly less water retentive – more like gravel! Thus the probable most significant factor is cost. The result for Perlite surprised me; it is very similar to Seramis in its performance if one ignores its low density, which is not really important unless you keep your pots in a very windy spot! I'd be very interested to hear of other inorganic materials that readers may have used, with or without success, perhaps by letter to this Journal.

Material	Approximate Volume ¹	Drained Wet Weight ²	Water Retained	
			by Weight ³	by Volume ⁴
Hydroton [®] <8mm	45 ml	29.8 g	19%	11%
Hortag [®] 5 – 8mm	30 ml	28.5 g	14%	12%
Pumice 5mm	45 ml	27.2 g	9%	5%
Seramis [®]	70 ml	47.5 g	90%	32%
Perlite (coarse)	230 ml	92.0 g	268%	29%

Table 1: Comparison of inorganic aggregates

Tests were performed using 25 g of each material and data show: ¹ the volume of 25 g of the material; ² the wet weight, measured after water saturation and draining; ³ percentage water retention calculated on a weight basis by subtracting the constant 25 g material weight from the wet weight and dividing by the 25 g material weight; ⁴ percentage water retention calculated on a volume basis by subtracting the constant 25 g material weight from the wet weight to give the volume of retained water in ml (1 g water has a volume of 1 ml) and then dividing this by the material volume. Percentages were adjusted to the nearest whole percentage point.

Ophrys apifera Fungi Ted Weeks

I have been growing orchids from seed both symbiotically and asymbiotically, for many years. Although we have fungi available from the Hardy Orchid Society's Seed & Fungus Bank which can germinate a few species i.e. *Dactylhoriza*, *Anacamptis*, *Serapias* and *Spiranthes*, we do not, as yet, have a fungus for the *Ophrys* species, *Ophrys apifera*.

I applied for and was given written permission to take samples from a plant of this

species, growing locally in the grounds of my company. These samples were taken for the purpose of attempting to isolate fungi, which would germinate *Ophrys apifera*. At the present time, after many trials, I now have fungi germinating this species. I have passed on samples for a couple of HOS members to try, and I am hoping to have feedback on the viability etc.

Of course, I still have more research I need to do on the fungi and the protocorms I have germinated. When I have completed this research I shall make samples available to the Seed & Fungus Bank, for members wishing to attempt to grow *Ophrys apifera* symbiotically. The plant from which samples were taken from went on to flower with no apparent ill effects in following years.



Ophrys apifera (Bee Orchid)
Photo by Mike Gasson

A Note on the Fly x Bee Hybrids **Robert Kempster**



Fly x Bee Orchid
Photo by Robert Kempster

The recent discovery of the Fly Orchid x Bee Orchid hybrids in south west England has provided an opportunity for the study of these spectacular orchids. However, many of the photographs of such hybrids have failed to give the full picture, since nearly all of them portray the sepals having a pale yellow-green colour. It seems that the sepals very quickly fade to this colour, but when the flower is newly opened they are a delicate pinky-mauve in colour.

It is good to have three major books on British orchids published recently, but many orchid enthusiasts may long for a book devoted to the hybrids, with identification notes and illustrations.

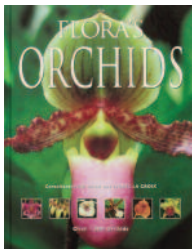
Growing Hardy Orchids Book Review by Jim Hill

Growing Hardy Orchids by John Tullock, Timber Press, Oregon (2005) ISBN 0-88192-715-5, 244 pp, Price £20 (£17.50 from Summerfield Books)



Growing Hardy Orchids is a hardback book written by an American orchid enthusiast with an interest in their cultivation and conservation, as well as a professional interest in fish conservation. The book starts with the author's personal view of orchid conservation of native USA orchids, with particular reference to *Cypripedium acaule*. This is followed by a good account of hardy orchid culture dealing with composts, nutritional requirements, construction of outdoor beds and bogs, propagation by division and from seed, and the role of mycorrhizae. Chapter 7 is a "Catalog of Hardy and Half-Hardy Orchids" with excellent descriptions of North American orchids, but the author is obviously not so familiar with those from Europe. *Dactylorhiza fuchsii* is recommended to be grown in a bog, and the accompanying photograph appears to be that of a hybrid rather than the true species. Australian species and others from Asia are also described. This book finishes with a chapter on fish conservation and the problems with politicians who deliberately circumvent the provisions of the American "Endangered Species Act". This is a book with a few errors, but one which can be recommended to those who wish to grow American species, and also those who need good detailed instructions on the construction of outdoor orchid beds.

Flora's Orchids Book Review by Mike Gasson

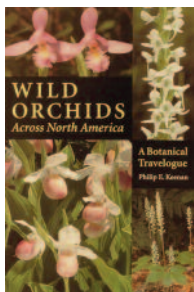


Flora's Orchids by Ned Nash & Isobyl La Croix, Timber Press, Oregon (2005) ISBN 0-88192-721-X, 368pp, Price £40

Flora's Orchids is a sumptuously produced large format hardback that comes complete with a matching slipcase. The emphasis is on the provision of a broad overview of the orchid world, with something of a focus on plants in cultivation. The book starts with chapters on orchid taxonomy and classification, hybrids and hybridization, cultivation, propagation, pests and diseases, and conservation. The main body of the book is an alphabetically arranged encyclopedia of the orchid world that features more than 1,500 entries, many of which are illustrated with high quality colour photographs. From the viewpoint of the Hardy Orchid Society, the majority of the entries fall outside of our main sphere of interest, but some hardy orchids are included. For example, there are

entries for seven *Cypripedium* species, three of which are illustrated. *Dactylorhiza* is represented by nine species with six illustrations, and there are six *Ophrys* and two *Orchis* species. The book provides an excellent pictorial account of the diversity of the whole orchid world, albeit with a perspective on cultivated plants. For the expert the book will lack depth, but this is compensated for by its breadth and the lavish illustrations.

Wild Orchids Across North America Book Review by Mike Gasson



Wild Orchids Across North America by Philip E. Keenan, Timber Press, Oregon (2005) ISBN 0-88192-720-1, 321pp, £19.99

This is a paperback version of a book first published in 1998. It has the sub-title “A Botanical Travelogue”, and this aptly describes the style adopted for an excellent account of orchids on the other side of the Atlantic Ocean. There are 38 chapters, with most devoted to a particular orchid, or occasionally a related group of orchids, and these are well illustrated with the author’s photographs. The orchid chapters are arranged in geographical clusters that cover, Alaska, Canada, New England, and several distinct regions of the USA. The tropical species that are exclusive to Florida and Mexico are excluded, providing a focus on the hardy orchid species. Each orchid is described in the context of a particular location, with an account of the author’s visit, and this often includes a broader perspective on the area’s natural history. This makes for a very readable and relaxed account of selected species of interest, and a comprehensive coverage is not attempted. For the latter, a complete list of species that occur in North America, together with a guide to identification, are included at the end of the book. Also, the book includes a useful chapter on naturally occurring hybrids between species of *Platanthera*, *Cypripedium* and *Spiranthes*.

There is a particularly good coverage of *Cypripedium* species that will appeal to those with an affection for Lady’s Slipper Orchids. This includes such gems as Palamino (*C. yatabeanum*), Purple Spotted (*C. guttatum*), Sparrow’s Egg (*C. passerinum*), Pink (*C. acaule*), Ram’s Head (*C. arietinum*), Large Yellow (*C. parviflorum* var. *pubescens*), Queen (*C. reginae*), White (*C. candidum*), and California (*C. californicum*). In addition, many other beautiful and unfamiliar orchids are described, together with the occasional familiar species encountered in Europe. This text would be an excellent choice for anyone interested in broadening their hardy orchid perspective to include North America.

Timber Press books can be obtained from Grantham Book Services Tel. 01476 541080 or Email to orders@gbs.tbs-ltd.co.uk or try Summerfield Books (see advert page 31).

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