Journal of the HARDY ORCHID SOCIETY

Vol. 3 No. 2 (40) April 2006

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).

The Hardy Orchid Society Committee

Front Cover Photograph

Broad Leaved Helleborine, *Epipactis helleborine* with wasp, photographed by Guenther Blaich.

www.hardyorchidsociety.org.uk

Contents

Editorial Note

At the start of a new orchid year it seems fitting to highlight conservation issues, and hence the inclusion of Marilyn Light's thoughful article on environmental stewardship (page 47). Many thanks to Marilyn for this, and also to Guenther Blaich from Germany for the cover photograph complementing the first part of Tony Hughes' excellent article on orchid pollination. Guenther hosts an exceptional web site with many other superb photographs of orchid pollination, as well as in depth information about orchid hybrids. It is well worth a look on http://www.guenther-blaich.de. Lastly, please note that Barry Tattersall has changed his e-mail address, please use barry.tattersall@tiscali.co.uk.

Field Trips 2006

Please book through the nominated contact, but remember that all field trips are limited to a maximum of 15. General questions about field trips to David Hughes, cchughes1@waitrose.com or tel. 01425 470464.

Sunday 23rd April: Purbeck for Early Spider Orchids. Contact Norman Heywood, nandaatngf@supanet.com.

Sunday 21st May: 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.

Saturday 1st July: Gowk Bank in Cumbria. Contact Alan Gendle, tel. 01539 824691 or alan@gendle.plus.com.

Sunday 4th June: Suffolk reserves for *O. militaris* and *D. incarnata*. Contact Mike Gasson, tel. 01328 829680 or moorend@globalnet.co.uk.

Spring Meeting, 30th April 2006
Roger Gelder - Meeting Organiser

The HOS Annual General Meeting and Plant Show will both be held as part of our 2006 Spring Meeting at Exeter Hall, Kidlington, on 30th April. The programme for the day is as follows:

09.00 Doors open: Plant Sales tables open; Plant Show entries to be staged by 09.45.
10.00 Tea / Coffee.
10.30 Chairman's Welcome, followed by AGM.
11.45 Mike Powell: *"*Cultivation of Terrestrial Orchids*"*.
13.00 Tea / Coffee for all; Lunch Buffet for those who have paid in advance!
14.00 Phil and Gwen Phillips: *"*Return to Mediterranean Orchids*"*.
15.00 Tea / Coffee.
15.15 Plant Show Judge: Comments on winning plants.
15.30 *"*5 Slides in 5 Minutes*"* - several short presentations.
16.00 *"*Ask the Experts*"* - Richard Bateman, Richard Manuel and Bill Temple provide all the answers!
16.30 Closing Announcements. Hall to be vacated by 17.00.

The Committee has found *"*volunteers*"* for this year's three Officer vacancies (Secretary, Treasurer and Membership Secretary), but there are several vacancies for *"*ordinary*"* Committee Members. So please either volunteer or submit names of any willing souls to the Chairman (tonyhughes3@btinternet.com) at least 2 weeks before the meeting.

Details of the Plant Show are given elsewhere, together with some new advisory notes for exhibitors. Please let us know what you think of our recommendations.

The rest of the meeting contains our usual mix of presentations. Mike Powell is a first rate cultivator of orchids, though he admits that some of the plants he will discuss are not strictly *"*hardy*"*. Phil & Gwen Phillips have travelled extensively over many years in search of wild orchids, and have promised a *"*twin screen*"* presentation (which may include a few *"*non-orchids*"*). The *"*5 Slides in 5 minutes*"* slot is an innovation that will give room for 5 or 6 presentations on a range of topics. We could still do with a couple more volunteer speakers who fancy five minutes of fame, so why not put your name forward - unconventional topics may be welcomed! Finally, for the *"*Ask the Experts*"* slot, while we will be happy to take questions on any relevant matter from the floor, people may get better answers if they e-mail their questions to the Chairman in advance!

An application form for the Spring Meeting is enclosed with this Journal, so why not

join us for another great day. Exeter Hall will be open from 9 am and has ample parking space as well as good access for the disabled.

Road Directions to Exeter Hall, Kidlington

From the North via the M40

Leave the M40 at J9, take right-hand lane on the off-ramp and follow signs for A34 Oxford. Head S on A34 for ~6 miles, then leave dual carriageway and follow signs to go under A34 onto A44. Almost immediately go right at next roundabout onto A4260. After half a mile take second exit at roundabout, (still A4260) and continue for ~1.5 miles to centre of Kidlington. Go past *"*Yarnton Road*"* on the left, and Exeter Hall is 50 yards ahead on the same left-hand side, in a block of trees.

From the South and East via the M40

Leave the M40 at J8 onto A40 towards Oxford. After 6 miles take third exit from roundabout onto the Oxford outer ring road, still A40. After about 4 miles take third exit from roundabout onto A4165 Banbury. Continue on this for ~3 miles to the centre of Kidlington. Go past *"*Yarnton Road*"* on the left, and Exeter Hall is 50 yards ahead on the same left-hand side, in a block of trees.

Schedule of Classes for the Plant Show

1. Six pots hardy orchids, distinct varieties. **2.** Three pots native British orchids, distinct varieties. **3.** Three pots native European (non British) orchids, distinct varieties. **4.** Three pots non-European orchids, distinct varieties. **5.** Three pots hardy orchids distinct, any country of origin. **6.** One pot native British orchid. **7.** One pot native European (non-British) orchid. **8**. One pot non-European hardy orchid. **9.** One pot *Dactylorhiza*. **10.** One pot *Orchis, Anacamptis* or *Neotinea*. **11.** One pot *Ophrys*. **12.** One pot *Serapias*. **13.** One pot *Cypripedium*. **14.** One pot, any other genus of hardy orchid.

Guidelines for HOS Plant Shows

1. Definitions. For the purposes of HOS Plant Shows, the term *"*Hardy*"* includes all plants that could reasonably be expected to survive winter temperatures down to 0^{o}C, whether in the open or under glass. The term *"*pot*"* is used for any container that a plant is exhibited in, and does not imply any particular shape or material.
2. Ownership. All plants exhibited must have been owned and cultivated by the exhibitor for at least six months prior to the date of the show.

3. Pots. The HOS does not specify any aspect of the containers that plants may be exhibited in. However, the size and shape of a container should always be appropriate for the plant(s) it contains.

4. Number of Plants per Pot. Unless otherwise stated, each pot may contain more than one plant, provided all plants are similar forms of a single species.

5. Lifting of Plants. It is not required for a plant to have been grown in the pot in which it is exhibited.

6. Labelling. All plants should be clearly and accurately named with a label placed (preferably horizontally) in the pot. Further information on any relevant aspect of an exhibit is always welcomed, written neatly on a card placed beside the exhibit. However, neither inaccurate labelling nor the presence of additional information will influence the judging of the exhibit.

7. Hybrids and Varieties. Where a hybrid or variety is exhibited that does not occur in the wild, it will be judged where possible with reference to similar naturally occurring plants.

8. General Considerations. Note that plants will be judged as they appear on the show bench; no allowance will be made for past glories or future potential.

- the suitability of the plant, and particularly whether it is *"*hardy*"* (see 1);
- the overall appearance of the plant, and particularly if its character is that of a mature plant in the wild;
- the condition of the flowers;
- the condition of the foliage;
- in multi-pot classes, all plants will be considered equally;
- all other things being equal, the difficulty of cultivating the plant(s) may be considered;
- the rarity of a plant, in the wild or in cultivation, shall not be considered.

9. Desirable Characteristics:

- a plant that has the form and stature of a mature plant in the wild;
- flowers that are of good size, shape and colour, fully out, and well-presented on sturdy stalks; with multiflowered spikes, and a good proportion of the flowers should be fully open;
- foliage that is clean, of good colour and undamaged (note, in those varieties whose foliage is normally withered at flowering time in the wild, due allowance should be made);
- a plant that is free of pests and diseases;
- pots that are clean and undamaged, and of a diameter and depth apropriate for the plant(s) contained;
- where a pot contains more than one plant, similar form and flowering of the individual plants is desirable.

10. Undesirable Characteristics:

- a plant that is immature, forced, or unnaturally dwarf;
- flowers that are atypically small or few in number, distorted, of poor colour,

not fully open, going over, or held on weak stalks;

- flower spikes that contain a high proportion of unopened buds, dead or dying flowers, or from which much material has been removed;
- foliage that is dirty, damaged, of poor colour or prematurely withered;
- plants that are diseased or harbouring pests (note, if a transferable pest or disease is detected, the stewards will remove the plant from the show bench);
- where a pot contains more than one plant, non-uniformity between the individual plants is undesirable;
- weeds, algae or undesirable moss on the surface of the compost;
- pots that are dirty or damaged, or which are an inappropriate diameter or depth for the plants contained.

Pollination of European Orchids - Part 1

Tony Hughes

One of the great fascinations of orchids stems from the wonderful variations in their flowers - fantastic structures which have evolved to ensure effective pollination, usually by insects. The pollination story is an amazing one, with all the ingredients of a best-seller, complete with deception, drunkenness, sexual deviation, false promises, entrapment, DIY and even superglue!

This article, based on a talk given at Wisley, only covers part of the story - the bit that applies to European orchids. Perhaps someone else will be encouraged to deal with the rest of the world later on. In preparing the talk I relied heavily on two books. *"*The Various Contrivances by which Orchids are Fertilised by Insects*"* was published by Charles Darwin in 1877, an expanded second edition of his 1862 publication. It is a masterly exploration of the subject and a long-lasting testimony to a meticulous scientist. *"*An Atlas of Orchid Pollination - European Orchids*"* was published 10 years ago by Nelis van der Cingel, and provides a comprehensive review of recent scientific literature, but nevertheless still relies heavily on Darwin.

The ideal strategy for a plant that wants to ensure pollination by insects involves 3 aspects: (1) Long-range attraction - shapes, colours and smell; (2) Comfortable contact - guidance to the right places; (3) Reward - usually food or drink, but there are other possibilities!

A very broad generalisation says that all flowers have evolved to ensure they will be pollinated. In many insect-pollinated flowers, large quantities of powdery pollen are produced, some of which may adhere to crawling insects and then be transferred to the stigma - a chancy process. Orchids have developed much more sophisticated mechanisms. To understand them, a little knowledge of the detailed structure of the flowers helps. Many of the orchid family's closest relatives have floral parts

arranged in groups of three or six. For example, a tulip has two rings of 3 petals, 6 stamens with prominent anthers at their tips, and three stigmas. An orchid, however, does not have the same symmetry. One can see the outer ring of three sepals and the inner ring of three petals, one of which, the lip, is very different from the rest. In those orchids that have a spur, it is merely an extension of the basal region of the lip. But where are the 6 stamens and 3 stigmas? All one sees is a rather complicated tower in the middle, known as the *"column"*, which contains both stamens and stigmas. Darwin's book provides a nice sketch that unravels the mysteries of the column, derived largely from microscopic examination of structures he could see in developing flower buds. This shows how 5 stamens are either vestigial or incorporated in other floral parts. The only functional stamen has its anther at the top of the column, containing two large lumps of pollen known as *"*pollinia*"*. Likewise, only 2 stigmas remain, usually at the front of the base of the column. The third stigma has been modified into the *"*rostellum*"*, an important projection at the front of the column, separating the pollinia from the stigmas. (Note that this description does not apply to the Slipper Orchids - *Cypripedium, Paphiopedilum,* etc. - which have a distinctly different column structure).

Within the pollinia, the pollen grains are usually held together by threads; in many species these threads extend at the front end to form a *"*caudicle*"* - a flexible string joining each pollinium to the rostellum. The rostellum is a factory for superglue! Its surface is covered by a thin membrane which, when touched, ruptures and releases the glue which rapidly hardens when exposed to the air. If an insect's head has touched the rostellum, then the glue attaches the lower end of the caudicles to the head. When the insect backs away, both pollinia are withdrawn from the anther. Then an amazing thing happens - the caudicles bend forward so that the pollinia are in the right position to contact the stigmas of the next flower visited. While this general description applies to many species, there are plenty of variations, some of which will be described in more detail later.

Dactylorhiza fuchsii pollinia on a cocktail stick
Photo by Tony Hughes

The Greater and Lesser Butterfly Orchids (*Platanthera chlorantha* and *P. bifolia*) seem to follow the strategy outlined above, with night-flying moths as principal target pollinators. Their large white flowers stand out well in poor light, and their evening perfume is quite powerful. The lip provides a convenient landing platform, although some moths may prefer to hover. The long spur, with copious nectar at the

tip, encourages the moth to insert its proboscis as far as possible until some part of its head ruptures the membranes that release the glue. Then, when the moth has exhausted the nectar, it flies away with the two pollinia adhering firmly to its front end. As Richard Bateman pointed out in a recent issue of the HOS Journal, the pollinia of the Greater Butterfly Orchid are widely separated so that they adhere to the moth's eyes, whereas those of the Lesser are close together and stick to the proboscis. Any intermediate spacing of pollinia would result in the glue touching the scaly parts of the moth's head, and adhesion would be poor.

Fragrant Orchids (*Gymnadenia* species) adopt a similar strategy, having long spurs, strong perfume and copious nectar, but their smaller pink flowers tend to attract day-flying moths. Bill Temple's magnificent picture of a Hummingbird Hawk-moth in action illustrates exactly how it all works.

Hummingbird Hawkmoth visiting *Gymnadenia conopsea*
Photo by Bill Temple

The Vanilla Orchids (ex-*Nigritella* species - now *Gymnadenia*) have a 360^{o} twist in their ovaries so that the lip is uppermost and the column is below the spur entrance. However, this does not appear to reduce the effectiveness of the pollination mechanism, which usually relies on butterflies. Where Vanilla and Fragrant Orchids grow together, the presence of hybrids indicates that, at least occasionally, the same pollinator will visit both species.

Charles Darwin was greatly intrigued by the Madagascan orchid *Angraecum sesquipedale*, with nectar-bearing spurs up to 12 inches long. He had been provided with plants by a certain Mr Bateman, whom he acknowledged with the reference *"*Mr Bateman, so well-known for his magnificent work on orchids, sent me a number of interesting forms*"*. [We might make similar comments 150 years later! Perhaps there is something in the Bateman genes?] Darwin knew that, although a moth with a 12-inch proboscis had been found in South America, nothing so vast was known in Africa, so he bravely postulated that some such beast must exist. In 1903, long after his death, such a moth was discovered and named *Xanthopan morgani* ssp. *praedicta*, the subspecies name recognising Darwin's prediction. I see that recently another *Angraecum* species has been discovered with even longer spurs, so now an even bigger moth has been postulated!

The Violet Limodore (*Limodorum abortivum*) also has a spur containing nectar, but it is not always insect pollinated. Frequently some or all of the flowers are *"*cleistogamous*"*, meaning that they fail to open, the pollen spontaneously falls onto the stigma of the unopened flowers, and self-pollination results. However, the flowers that do open are usually pollinated by large bees. One day in southern France I photographed a small wasp bearing orchid pollinia and meandering around on a Limadore flower. At the time I thought that I had caught a diminutive pollinator at work, but have subsequently realised that the pollinia on the wasp were much smaller than those of the Limodore. In fact, I had probably found a pollinator of *Serapias lingua* having a rest - things are not always quite as they appear!

The Helleborine (*Epipactis*) genus contains several species that are insect pollinated, while several others rely on self-pollination. The commonest species, the Broad-leaved Helleborine (*E. helleborine*), is insect pollinated and operates in much the same way as the less common Violet Helleborine (*E. purpurata*). The flower structures differ in several respects from those discussed above, most obviously in the shape of the lip. The inner half of the lip, known as the *"*hypochile*"*, is hemispherical (like a broad, shallow spur) and contains copious nectar. Because the hypochile is shallow, the nectar is readily accessible to insects with short mouthparts - frequently wasps. The outer half of the lip, the *"*epichile*"*, makes an effective landing platform. A sideways view of a helleborine flower reveals that the enormous pollinia have no caudicles. The rostellum is prominent and ruptures when a wasp's head lightly touches it. This releases a large glob of glue which attaches the tips of the pollinia directly to the wasp's head. Since the queen wasps are busy laying eggs and the female workers spend their time hunting meat for the grubs or gnawing timber to make paper for home improvements, it is usually the male wasps which visit these helleborines. The nectar is apparently intoxicating, so drunken wasps are sometimes encountered - reminiscent of men sloping off to the pub to avoid domestic chores!

The Dark Red Helleborine and the Marsh Helleborine are also insect pollinated,

though by a wider range of insects. Many other *Epipactis* species are self-pollinating. Usually the rostellum is less well developed and may shrivel before the flower opens. The pollinia are more crumbly, so the pollen readily falls onto the stigmas. Often the flowers hang their heads and open less widely; indeed, sometimes they fail to open at all.

Wasp with pollinia on
Epipactis helleborine
Photo by Tony Hughes

The rather unspectacular flowers of Twayblade (*Listera ovata*) do not offer the long-range attraction potential of all the species looked at earlier, but they are reputed to be perfumed. Many species of smaller flies are attracted to them, and when they land on the lip they are immediately rewarded with nectar which is secreted in the central groove of the upper half of the lip. They then lick their way up this groove till they meet with the column. Darwin's drawing of the structure reflects his fascination with the detailed pollination mechanism. Soon after the flowers open, the pollinia are revealed, lying on top of the rostellum. Although the lumps of pollen are held firmly together, they are not attached to the rostellum - there are no caudicles. However, the rostellum conceals a big surprise for the visiting flies, because as soon as its surface is touched it explodes, ejecting two globs of superglue which instantly attach the pollinia to the insect's head, drying hard in a matter of seconds. For a while the remains of the rostellum hangs down and impedes immediate access to the stigmas, but after a day or two it rises up so that pollen-bearing insect visitors can effect cross-pollination. The Lesser Twayblade (*L. cordata*) works similarly, but on a miniature scale and with smaller insects.

The Bird's-nest Orchid (*Neottia nidus-avis*) uses a very similar mechanism, with nectar on the lip and an exploding rostellum, and is normally pollinated by flies. However, the prevention of self-pollination is not so secure. Firstly, very small insects, such as thrips, frequent the flowers, and are quite capable of inadvertently brushing first against the pollinia and later against the stigma, thus transferring a few grains of pollen. Secondly, the pollen masses are fairly crumbly and, even with no insect intervention, pollen grains may drop off onto the stigmas.

In spite of its tiny flowers, the Autumn Lady's Tresses (*Spiranthes spiralis*) is often pollinated by small bumble bees which seek the nectar secreted at the base of the column. When the flowers first open, the rostellum lies so close to the lip that the stigmas are protected from any pollinia that may on the bee's proboscis. At this

stage, the flower exhibits only male characteristics. Subsequently, after the pollinia have been removed, the gap between lip and rostellum slowly widens until the stigmas are fully accessible. The flower is then effectively female. Since the flowers at the bottom of the spike open first and those higher up open later, a mature spike has the *"*female*"* flowers at the bottom and *"*male*"* flowers higher up. A visiting bee normally works its way up the spike, visiting the lower flowers first, before having the chance to pick up pollinia from the higher flowers. It then carries these pollinia away to the base of another flower spike, thus ensuring cross-pollination.

References

Bateman, R. (2005) Circumscribing and interpreting closely related orchid species. *J. Hardy Orchid Soc.* 2 (4): 104 - 111.
Darwin, C. (1877) *The Various Contrivances by Which Orchids are Fertilised by Insects* (2nd edn), reprinted 1984 by U. of Chicago Press, ISBN 0226136620.
Van der Cingel, N.A. (1995) *An Atlas of Orchid Pollination - European Orchids*, Balkema.

Disas in the Wild and in Cultivation
Alan Kindred's Talk at Wisley

There are approximately 180 species of *Disa*, all of which come from the South African continent, including Madagascar. There are 9 true evergreen species which maintain their leaves throughout their year, but the remaining majority of species require some measure of dormancy. Those living in desert conditions require extreme dryness, although this should never be so harsh as to cause desiccation. During dormancy, Disas remain leafless.

My presentation dealt solely with the evergreen group. The first recorded hybrid was made in 1891 by the nursery of Veitch and the Royal Botanical Garden at Kew, and fittingly it was named D. Veitchii (*Disa ramosa* × *D. uniflora*). In 1893, the same breeders registered another hybrid, which they named D. Kewensis (*Disa uniflora* × *D. tripetaloides*). From then until the year 1911 a further 22 hybrids were registered, but subsequently there was little recorded interest in Disas until the early 1970's. At that time four South African orchidologists decided that something needed to be done about the cultivation of these beautiful plants. Their approach was to grow them in running water, mimicking their situation in nature.

When I first became deeply interested in Disas some 12 years ago, they were still using this method. More recently they have been treating them more like ordinary plants, either watering when necessary or using an *"*ebb and flow*"* bench. The latter is basically the same as a running water bench except that the water is allowed to

fill up the bench and then drain away. Recently, I moved to watering as required, but I have overhead misting for the hot weather and for when I am unable to attend to them. Plenty of air is needed so as to prevent water staying too long on the plants. I will not be dealing with the deciduous Disas, as they belong to an entirely different orchid world that we are still getting to know. The skills needed for success with these amazing plants lies mainly in when and how much water to apply. A splash too much, and the tubers will rot! Keep them bone dry, and they desiccate! A summary of my approach to the cultivation of the evergreen Disas follows:

Medium: Having tried many mixes, I use now only New Zealand Sphagnum moss and coarse Perlite. The larger the pot, the greater the amount of Perlite or course grit required. Very small plants can be placed loosely in 100% moss. They must be potted on soon afterwards with a good proportion of "gritty" pieces such as Perlite, so as to keep the medium open. Moss compacts quite fast due to the water being applied, and this reduces the amount of air available to the roots. Death will not be too far away!

Water: Use only fresh rainwater whenever possible. All the vitamins and minerals they need are there. Should this prove impossible then use either bottled water, reverse osmosis or, as a last resort, tap water that has "stood" for a couple of days.

Air: Provide plenty, you can never have too much. I remove all the glass at bench level in the spring, and only replace it when needed around November time. The plants are protected from insects entering the house by green shade cloth.

Disa Uniangley 'Sexy'
Photo by Alan Kindred

Disa venosa
Photo by Alan Kindred

Disa Unikewbett 'Purple Man' ×
Disa Kewbett 'Shot Silk'
Photo by Alan Kindred

Temperature: The maximum for the plant above the pot and medium is 90°F. It is vital that the roots are kept cool, and the absolute maximum is 70°F. Coolness can be maintained by placing the pot inside another larger pot with damp sand in between. Alternatively, place some one inch thick polystyrene pieces around the side of the pot exposed to heat and hold them in place with an elastic band.

Food: None is the best advice! If you get to know the plants and wish to push them on a bit by using feed, then go **very** sparingly. Thoroughly wash the pots out at least once a month, using several washes of fresh water. Failing this you may not loose the plants immediately, but they may well suffer rot in a year or so.

Light: Some authorities say the plants should be exposed to as much light as possible to get the best colours in the flowers. I find that this makes the leaves look pale and I have been unable to see any difference in the colour richness of the flowers. As a result I shade quite heavily.

Several people attending the Wisley meeting asked about growing Disas in the garden. I have far too many for that, and thus have no personal experience. I think that it should be possible provided that the plant has some protection from rain above, particularly from late autumn to early spring. Allow them to receive as much air current as possible, and never allow them to become water-logged in *"*stale*"* water. Anything *"*stale*"* is a death warrant for these plants. In the wild they enjoy the purest of everything. Give them that in captivity, and anyone should be able to grow them without difficulty.

Anyone interested in seeing and photographing Disas in the wild would do well to visit South Africa between the middle of January and mid - February. It is possible to see *Disa uniflora*, *D. ferruginea* and *D. graminifolia* at the same time on Table Mountain. *D. graminifolia* is a stunning plant notable for its blue coloured flowers. Several other species would also be possible, including *D. cornuta*. There are many ways up, including walking up Skeleton Gorge from Kirstenbosch Botanic Garden and taking a ride up on the cable car. It is possible to purchase a map showing the mountain's footpaths, and I would be happy to advise anyone wishing to visit South Africa to witness these beautiful orchids.

Disa cornuta on Table Mountain
Photo by Alan Kindred

Step Softly: Environmental Stewardship

Marilyn H.S. Light

Spring is in the air! Native orchid enthusiasts are gearing up for another year of discovery and enjoyment of their favorite blooming beauties. Photographers are hoping to find the species that eluded them previously. Others, including myself, are looking forward to initiating or continuing long term tracking studies. Now is a good time to consider the relative impact of all those feet on the orchids and their environment.

Believe me, even one person moving carefully through the forest has an impact. Several people following in those same footsteps multiply the trampling effect. Damage to fragile ecosystems such as bogs and fens may be more quickly apparent, but all habitats are vulnerable to foot traffic. Ironically, it is the recent popularity of the *"*great outdoors*"* that exacerbates the problem. The very orchids that interest us may disappear as a result of our forays unless we consider the impact of what we do (Penskar and Higman, 2000; Meleg, 2003). Studies in Finland, Ireland and Switzerland have measured the effect of trampling on forest trees, tree seedlings, ground cover plants and on the soil microbial community. The first plants to disappear are tender herbs like mosses. With only minimal trampling 20 peatland species are lost (MacGowan, 1996). In a Finnish study, the microbial community structure of the humus layer in an urban forest was affected by a cascade of events beginning with trampling then extending to changes in vegetation and litter quality which ultimately affected humus pH (Malmivaara-Lämäsa and Fritze, 2003). The Swiss study by Waltert *et al.* (2002) investigated the impact of trampling on the mycorrhizal roots of seedling and mature trees. Not only did they report that trampling caused considerable damage to forest floor vegetation but it especially affected seedling trees and their mycorrhizal fine roots.

Dr Jyotsna Sharma prepares to photograph a fruiting plant of the Ram's Head Slipper Orchid (*Cypripedium arietinum*). She avoids kneeling which minimizes disturbance.
Photo by Marilyn Light

We do not yet have a measure of the indirect effect of trampling on orchids but there are reports of the deleterious effect of leaf dam-

age and removal. When leaves of *Dactylorhiza maculata* and *Tipularia discolor* were removed in whole or in part experimentally, plants became progressively smaller and were less likely to flower the following year (Whigham, 1990; Vallius and Salonen, 2000). Effects of human visitation and touch on plant growth and herbivory have been documented for species other than orchids (Cahill Jr. *et al.*, 2002; Hik *et al.,* 2003). Because we do not yet know enough about the impact of human visitation on orchids, we must minimize disturbance when we visit sites to photograph or otherwise study them. We must take care, and some guidelines to minimize any damage we may cause are presented below.

A: Consider the habitat and its relative fragility. Wetlands are especially vulnerable, and should be visited with great caution and preferably not in large groups.

B: Consider the orchid and its rarity. While we may want to see the *"*rare*"* ones, it might be best to leave a fragile site or a small population completely undisturbed. When in doubt, please don't.

C: Consider the orchid and its ecosystem. Orchids do not live in isolation. They have a complex life cycle and a reliance on particular habitat conditions to survive. Human visitation can lead to soil compaction, changes to the soil microflora and loss of vulnerable species.

D: Walk softly and carefully. Even relatively common orchids like the Broad Leaved Helleborine (*Epipactis helleborine*) deserve our consideration and respect if we expect to learn something meaningful about their behaviour. Ever since I began a study in 1985, I have limited my visits to the absolute minimum needed to gather data, have walked on exposed rocks wherever possible to minimize disturbance, and have resisted moving companion plants that were spoiling my view. I wear running shoes which are potentially less damaging than hiking boots.

E: Be an exemplary environmental steward. Stay on paths and walkways where they are provided and especially where the reserve respectfully requests that you do so.

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A Tale of Two (or More) Composts

Mick Peck

The idea for writing this little piece came as I was dividing up some *Epipactis veratrifolia* clumps, and idly thinking about what to repot them into this year. I soon realised that we have all become trapped in a never ending quest. Hence this wry look (with a serious element) at our obsession with compost mixes.

To a surfer, it's the hunt for the perfect wave; for a singer, the voice with perfect pitch; and for us plants people the Holy Grail is the search for the perfect compost mix: one mix so perfect that it reaches out and grabs the tubers and grows them to such perfection that the pot is crammed full.

I was looking back through some old HOS Journals when a friend came round and

began flicking through them. Suffice to say he is not a gardening type and after reading out a compost mix formulation remarked, *"*all looks a bit over the top to me, do you have all this stuff*"*. I mumbled some reply but after he had gone I reflected on his comments and looked through the various HOS articles. It seems that every year a new mix surfaces and, like followers of fashion, we agonise as to whether this is for us. I bet that each of you reading this has a *"*little addition or variation*"* that you are convinced works for you; don't worry, I do as well!

One grower says use leafmould *"*as it comes*"*, another says *"*sterilise it*"* to which another replies *"*what and kill all the good bugs*"*. We can no longer use ordinary leafmould it has to be *"*rubbed through Mesh X and collected on Mesh Y*"*. What happened to just using leafmould? On the subject of fertilizer, one comment shows our paranoia and fear of failure. Bonemeal, *"*X spoonfuls per Y litres of compost, not sure if it does any good but add it anyway*"*. Bark chippings, not a couple of handfuls thrown in but carefully matured bark with a deep rich russet colour with the early morning dew still clinging to it as it is gently folded in to the mix.

These might seem the ranting of a *"*grumpy old man*"* but they prompted me to relate my experience below which has stopped me always chasing the latest fads in compost mixes. Back in 1990 I was working for a large chemical company and was interested in growing wild flowers towards creating my own wildflower meadow. Orchids were just another flower of passing interest. I had found four Bee orchids (*Ophrys apifera*) growing on wasteland designated for a new Tank Farm and had stopped the site gardeners from their normal *"*slash and burn*"* site maintenance by ringing the plants with hazard tapes and buying them a few pints of lager (lager for the gardeners not the orchids in case you thought it was my secret additive).

In November 1990 the mechanical diggers moved in and, rather than lie down in front of them or chain myself to the bucket, I just dug out the orchids before a six foot deep hole appeared. I took them home, washed all the soil off and decided to pot them in my favourite wildflower mix of John Innes No 3 and multi - purpose compost 50/50. I potted them in an old 12 inch square polystyrene chemical tub. I kept waterfowl and chickens at the time, so used limestone grit as mulch on the surface to stop moulds etc. In 1991 they did not flower but the four rosettes returned again in October that year. The first flower spikes appeared in 1992 and in the autumn five rosettes appeared. Between then and now the numbers of rosettes and flowering spikes have fluctuated. The maximum number of rosettes has been 15 and the maximum number of flower spikes 10. As I write this (November 2005) there are ten rosettes.

Since those early days I have joined the HOS and read all the articles on compost mixes and the need to repot yearly etc and have been sorely tempted to repot them,

but if it ain't broke! The piece of advice, in an article by Richard Manuel, which I have followed recently is not to let all the flowers produce more than a couple of seed capsules. This tub of plants has had no top up of compost, is outside all year except in the most extreme cold weather and is given one feed of half strength tomato food once a year in the Spring. Over the years the companion plants that have seeded themselves into the tub are Fox and Cubs (*Hieracium aurantiacum*) and for the last two years Harebell (*Campanula rotundifolia*). The orchid rosettes are a really dark green and seem to show no deficiencies in relation to leaf colour (I once worked for Fisons at their horticultural research centre so know a little about mineral deficiencies).

Makes you think doesn't it? OK I admit that I have searched high and low for ingredients, and tried all sorts of recommended mixes Above all one thing is clear to me: IF you can get the plants outside IN THE SOIL they grow a hell of a lot better than cossetted in small pots. Would it be too controversial to say it's the watering regime rather than the compost that is the main factor in success or failure?

Must finish here as my automatic pH meter is telling me the rain is too acidic, my soil conductivity meter is unsteady and besides it's a full moon tonight so I'm off to the woods to sieve some compost - that is if the rain hasn't corroded the mesh too much and I can find my lucky sieving hat!

Apologies to anyone who may recognise their comments! Mick does his sieving, mixing and, if has any time left, grows orchids and wild flowers at Little Bealings in Suffolk and can be contacted at mickhere@btopenworld.com.

Visit to Cyprus February 2004

Peter and Pauleen Mottershead

We had been wondering where we could take an early spring holiday which would also enable us to spend some time searching for orchids, and decided that Cyprus would be our destination. We had obtained the book and video of Cyprus Orchids by Joan Hubbard and Pam Scraton, and decided to visit the area around Paphos for one week from the 18th to 25th February 2004. Arriving late on the Wednesday evening there appeared to be much water everywhere, and later we found out that the weather for the previous two weeks had been wet with thunderstorms.

On Thursday morning the weather was cool and sunny and, after picking up our hire car, we set off for the Akamas district north of Paphos. The first orchids we saw were *Himantoglossum* (*Barlia*) *robertianum* along the roadsides. These were in perfect condition, and the camera soon came into good use. Leaving Lakki we approached the Akamas peninsula and here we saw many Cyclamen, Muscari and Friar's Cowl.

We went in the direction of Smigies picnic site, and on the roadside found a large group of *Himantoglossum* (*Barlia*) *robertianum*, and nearby on both sides of the road many *Anacamptis* (*Orchis*) *collina*. Around the picnic site we saw very little apart from *Anacamptis* (*Orchis*) *syriaca* and *Ophrys elegans* just coming into flower. We retraced our steps and continued to the Pegeia Forest but nothing was seen and we decided to return a few days later.

On Friday the weather again was sunny and cool. We decided to go to the salt lake area at Akrotiri, and took the road down to the Monastery of the Cats. Just before the car park there was a large open area of land with many orchids in leaf. However, we did find *Ophrys sicula*, and eventually *A. collina*, together with a few of its *"leucoglossa"* variant and *Ophrys flavomarginata*.

On Saturday the weather turned very wet and foggy and we went along the E702 into the hills towards Choulou. We saw many *H. robertianum* on the old terraces near Lemona but nothing else was found. We then made our way to Pegeia Forest but found only *Ophrys levantina*.

On Sunday the weather was sunny and cool again and we decided to go to Smigies looking for *Orchis punctulata* which we did not find, but again found many *H. robertianum* and *A. collina*. At Smigies we went on the nature trail alongside the car park and found *Orchis quadripunctata*; mostly whitish in colour, very few pink, but many plants everywhere. In this area we also found *Ophrys funerea* and a little further along *Orchis troodi*. Returning to the car and just leaving the car park we found *Dactylorhiza romana* just coming into flower with small numbers of *Ophrys levantina* and *Orchis syriaca*.

No new species were found in this area, so a couple of days later we decided to go to the Troodos Mountains. On the way up to the snow covered summit we found *H. robertianum* on the roadsides, but nothing else as we were too early in the season for this part of the country. We returned to Paphos via Akrotiri where we managed to find the lowland site for *Epipactus veratrifolia* growing on the sheer wet rock face at Episkopi. Here we saw approximately 150 spikes but only three or four flowers were open.

On the Saturday morning before returning home we visited the Mosaics at Paphos and found *Ophrys umbilicata*. Overall it had been an enjoyable week, although the weather could have been better, so we decided that on a return visit we would try a week or two later in the season. We would also do a little more preparation before our next trip. Since this visit we returned to Cyprus for two weeks 26th February to 12th March 2005, and this proved to be a far more successful visit – but that is another story.

Some of the orchids seen in Cyprus are illustrated here:

1) *Anacamptis* (*Orchis*) *collina*
2) *Ophrys levantina*
3) *Ophrys sicula*
4) *Orchis quadripunctata*
5) *Orchis troodii*
6) *Ophrys flavomarginata*
7) *Orchis troodi*
8) *Epipactus veratrifolia*

Photos by
Peter Mottershead

Mullagh More Orchids

Nigel and Lois Harbron

For many people, Mullagh More is the heart of the Burren - that wonderful area of karst limestone in Co. Clare, Ireland. Mullagh More itself is a mere 700 feet high, but it is not an easy walk to its summit, given the difficulty of crossing the limestone pavements of its lower slopes, and then the problem of finding a way up the several steep cliffs which surround the mountain. At the foot of Mullagh More lies Lough Gealain, a classic Burren turlough or disappearing lake. View it in Winter or Spring and it is a good-sized lake; look for it in Summer and all you will find is a small muddy puddle! The picture of the area was taken on 2nd June 2005 after a very wet Spring. Amazingly, many plants (such as the turlough violet and dandelion, as well as several species of orchid) have evolved to the point where they can cope with being six feet under water for six months in the year - and longer in a wet year!

Traditionally, cattle have grazed Mullagh More during the winter months (when the copious amount of rainfall ensures they don't go thirsty). Then, they are taken down to more lowland - and increasingly *"*improved*"* - pastures in the summer, where water can be easily laid on. This *"*upside down*"* grazing arrangement (compared to that in most of the UK) ensures that the limestone pavement and its grassy terraces are kept fairly clear of hazel and ash scrub, thus allowing plenty of places for orchids to establish themselves, and then thrive without pressure from grazing during their flowering and seeding periods. Having said this, there is growing concern about the impact that changes in the timing and intensity of grazing are having on the area, and there is certainly much more scrub on Mullagh More than there was when we first visited six years ago.

Views of Mullagh More and Lough Gealain
Photos by Nigel Harbron

Not surprisingly, the first orchids to flower are Early Purple Orchids (*Orchis mascula*), and they are so prevalent that one can almost tire of them. As they begin to go over, Dense Flowered Orchids (*Neotinea maculata*) come into their prime. Although regarded as not common, they are

Dense Flowered Orchid, *Neotinea maculata*
Photo by Nigel Harbron

Fly Orchid, *Ophrys insectifera*
Photo by Nigel Harbron

thinly scattered all around Mullagh More, preferring grassy areas to pavement. We have recorded them in their prime in the last week of May, but another year they were just about over by then. Small White Orchids (*Pseudorchis albida*) are recorded in the area, but we haven't seen any. By the end of May, Heath Spotted Orchids (*Dactylorhiza maculata*) tend to be the "default" species, along with plenty of Twayblades (*Listera ovata*), occasional Fly Orchids (*Ophrys insectifera*) and just the odd Frog Orchid (*Dactylorhiza (Coeloglossum) viridis*), with Lesser Butterfly Orchids (*Platanthera bifolia*) coming along in early June.

Until our last trip (early June, 2005), we had seen no Bee Orchids (*Ophrys apifera*) in the Mullagh More area, but we found hundreds this year, and here's why. During the early 1990's, a developer came up with the bright idea of building a huge visitor centre at the foot of Mullagh More. Such was his confidence that his plans would be passed that he cheerfully bulldozed several acres of pavement to create a flat car-parking area. Fortunately, sense prevailed; planning permission was refused, and our developer went off to destroy another part of the country, leaving the legacy of his barren, scraped car-parks behind him. The areas are still unusually flat and, from a distance, seemingly barren, but they are now full of Early Purple, Bee and Fly Orchids, as well as Common Twayblades. No doubt other species of orchids will occur there later in the year.

Although there are not that many types of Marsh Orchid, by the shores of the turlough at the foot of Mullagh More (and occasionally in the water itself) can be found the handsome *Dactylorhiza incarnata* subsp. *cruenta*, coming into full flower at the end of May / early June. On the slopes of the

Dactylorhiza incarnata subsp. *cruenta*
Photos by Nigel Harbron

mountain, we are fairly certain that we have also seen a specimen of the Narrow Leaved Marsh orchid, *D. traunsteinerioides*, as well as the much more numerous Common Spotted Orchid, *D. fuchsii* (both the usual type and the white variant, *okellyi*).

Finally, in the grikes (or scailps as they are known locally) both Broad Leaved and Dark Red Helleborines (*Epipactis helleborine* and *E. atrorubens*) grow in fair numbers later in the year (late July/early August). We did not spot any hybrids between the two, but it would be worth a search for those who are interested in such things.

If you are visiting the Burren, then a trip to Mullagh More is strongly recommended, but, if at all possible, go on a sunny day in order to appreciate the astonishing colours of what can only be described as an alien-looking landscape. Although not a high mountain, Mullagh More holds more than its share of potential dangers for inexperienced walkers, and it certainly supports a thriving population of ticks. Even if the sun is shining, save the shorts for the beach, and try to avoid the bracken and hazel scrub - although this is an increasingly difficult thing to do.

Finally, should you visit the Burren area, you will see that it is not perhaps as appreciated by its local population as it is by its visitors. Ireland's "tiger economy" is a very new phenomenon in a country traditionally associated with poverty and hardship, and it is easy to see why changes are occurring. Unfortunately, it seems that the environment is always first to suffer when the economy is booming, and it is important that the Irish Government is constantly reminded of the gem it has overall responsibility for in the shape of the Burren. At least Mullagh More lies within one of country's few National Parks.

American Native Orchid Conference 2005

Mike Parsons

The fourth North American Native Orchid Conference was held in July 2005. I attended the Conference in Manitoba with my HOS friends from the U.K., Graham Giles and Simon Andrew. We travelled together from the airport to the meeting venue at St Benedict's, a monastery on the Red River just to the north of Winnipeg. It was to be our home for the next few days and things got off to a good start, meeting our old friends and reminiscing about previous adventures. On the first day most of the lectures were about the Western Prairie Fringed Orchid (*Platanthera praeclara*) - a rare plant only found in the central states of the USA and Manitoba, Canada.

Western Prairie Fringed Orchid, *Platanthera praeclara*
Photo by Graham Giles

Unusual double-headed Showy Lady's Slipper Orchid, *C. reginae*
Photo by Graham Giles

Dr Charles Sheviak described how he had discovered that it was a separate species from the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*). The two species are very similar, both being white with a beautiful white fringe. There are several differences between them, apart from the obvious one of size. In particular, the pollinia and viscidia are further apart in *P. praeclara*. Dr Richard Westwood and Christie Borkowski provided an overview of the pollinator relationships, identifying the involvement of two night-flying sphinx moths. The use of ultraviolet light to promote insect visits was described; it may be an interesting potential method to increase rates of pollination. An investigation of fungal relationships was presented by Dr Jyotsna Sharma, who also described how small populations were more homozygous genetically. Nancy Sather presented work on *P. praeclara* conservation in Minnesota, and Marge From spoke about micropropagation and re-introduction. Other subjects were presented during the conference, including several talks on other aspects of Manitoba's orchids. In addition, Ronald Coleman provided an interesting account of the impact of fire on orchid populations, Marilyn Light talked about the native bee

Western Prairie Fringed Orchid
Platanthera praeclara
Photo by Graham Giles

Small Purple Fringed Orchid,
Platanthera psycodes
Photos by Graham Giles

species visiting the Yellow Lady's Slipper Orchid (*Cypripedium parviflorum* var *pubescens*) and Dr Carla Zelmer provided an overview of symbiosis and fungal associations with orchids.

Our first field trip involved a visit to the Tall Grass Prairie Preserve near Tolstoi. It is a beautiful protected area of tall grass prairie where we saw the endangered *Platanthera praeclara* that had featured so prominently in the lectures. Other orchids seen here were *Cypripedium parviflorum* and *C. pubesens* with *Liparis loeselii* in seed. At other times of the year it would have been possible to find the rare *Cypripedium candidum* and *Spiranthes magnicamporum*. As we were leaving the reserve for lunch we had the ornithological bonus of seeing the rare Yellow Rail, flushed out by the orchid photography.

After lunch we continued to Woodridge Bog where we were told 17 species of orchid have been reported. We parked by the side of the road and headed into the woods. It was not long before we found *Cypripedium reginae* (Showy Lady's Slipper) still in bloom, although *C. arietinum*, *C. parviflorum, C. pubescens* and *Amerorchis rotundifolia* were now in seed. We did find some fine stands of *Platanthera aquilonis* and *P. huronensis*, and although Chuck Sheviak explained the main features to us, we still found it difficult to tell these two green orchids apart. There were some good stands of *Platanthera orbiculata* (Pad Leaved Orchid) which have white flowers with long spurs that attract the moths. Also we found *Malaxis brachypoda* (very similar to *M. monophyllos* from Europe), *Goodyera repens* var. *ophioides* with tessellated basal leaves, *Listera corda-*

Corallorhiza maculata
Photo by Graham Giles

Mosquito-protected Graham Giles photographs *Corallorhiza maculata*
Photo by Marilyn Light

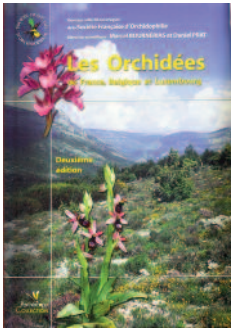
ta, together with the ubiquitous *Platanthera obtusata* (Blunt-Leaved Rein Orchid), and one emerging *Spiranthes romanzoffiana*.

It was getting late in the day but we decided to travel on to the only Manitoba site for *Platanthera psycodes* (Small Purple Fringed Orchid) which is just beside the US border into Minnesota. It seemed to take a long time to reach the roadside verge at Buffola Point, but it was well worth it. There were about a hundred plants, which had avoided the dreaded roadside mower. The next day some of the party returned to the site finding white and two-toned varieties, and they were lucky to see the Northern Lights on their return.

Our last field trip was to The Brokenhead Wetlands at the south east corner of Lake Winnipeg. Here, 28 of Manitoba's 36 native orchid species have been recorded. When we entered the woods before the fen we saw a collection of Corallorhizas. First there was *C. maculata*, with forma *flavida, C. striata* and *C. trifida* showing their last florets. Then there were *Malaxis unifolia* and *M. brachypoda* in full bloom beside the paths. Most of the Cypripediums were here too, but only *C. reginae* was showing blooms, including one that was virtually forma *albolabium*. In the fen we saw some impressive stands of *Platanthera dilatata* (Bog Candle), with the occasional *Calopogon tuberosus* (Grass Pink). Other orchids seen were *Amerorchis* in seed, *P. aquilonis, P. huronensis, P. obtusata, P. orbiculata, Listera cordata* and *Liparis loeselii* which Graham Giles found in full bloom. It wasn't quite 28 species, but I think 18 were very good for one morning!

I would like to thank all of the Conference Committee, especially Lorne & Joan Heshka, for making this meeting possible. I had a great time and would also like to thank all my friends for making the trip extremely enjoyable.

Les Orchidées de France, Belgique et Luxembourg
Book Review by Richard Manuel



Les Orchidées de France, Belgique et Luxembourg by Bournérias M., Prat D., Société Française d'Orchidophilie, Biotope Collection Parthénope, Mèze (2005).
ISBN: 2 - 914817 - 11 - 8 (Second Edition)

When I reviewed the first edition of this book, in HOS Newsletter No. 11, Jan 1999, I considered it to be the best-produced Orchid Flora in Europe: well, the second edition is better! It is bigger by 89 pages (415 vs 504); lots more photos (though one or two are below the standard set by the others); 12 more full species (if that is a good thing!); and it is now in hardback. Moreover, the price of €45 (€42.50 for SFO members), is scarcely more than the 300 French francs they asked seven years ago, probably less in real terms: value indeed, in this rip-off age!

The increased page count is partly due to more detailed introductory blurb, and partly to the increase in species. It is pleasing to see that they have given those flagship French orchids, the *"*anthropomorphic orchises*"* more space and pictures; and even more so now that they have separated out *Anacamptis* and *Neotinea*, *à la* Bateman. *Listera* and *Coeloglossum* are retained, which is curious, and not all the species and other taxa included will go unchallenged by other authors. The species descriptions are clear and not over-fussy; there are good distribution maps for each taxon; and of course, several (always interesting) photos, including some very nice habitat shots. Throughout the book the attention to detail is noticeable, including numerous attractive *"*extra*"* (but hardly gratuitous) photos slotted in here and there. With a few exceptions this book has carried on its tradition of superb photographic quality and, most importantly, careful selection of the photographic subjects; something that not all such books take seriously. Like the book reviewed below, this one is in French; but this is not really a handicap to the non - french reader as it doesn't really take much imagination to understand the species descriptions and the other more important pieces of text.

For those who have not seen the first edition of this book, the quality of production - photographic printing, paper and binding, and clarity of layout, is superb, and I can thoroughly recommend it as probably the best up-to-date orchid flora in Europe. It is available from the SFO (Société Francaise d*'* Orchidophilie) at 17 quai de la Seine, 75019 Paris, which accepts VISA and Mastercard (sfo@sfo-asso.com - look up Tarifs) at the above price plus €7.25 P&P.

Les Orchidées Sauvages de France Grandeur Nature
Book Review by Richard Manuel

Les Orchidées Sauvages de France Grandeur Nature by Remy Souche, Les Créations Pelican (2004).
ISBN: 2 - 7191 - 0642 - 9

This is a rarity: an orchid book with an element of Fun. It comes in a large format, soft but sturdy cover, 23 x 31cm, 340 pages, and just under a hefty 2 kgs in weight. Although in French this is scarcely a disadvantage as it is largely a picture book. There is interesting text for francophones to digest, but the non-french reading orchidist can derive a great deal of interest and pleasure too.

The book begins with a long section on the botanical history of native orchids, with a fascinating collection of illustrations from early floras. This is followed by brief and somewhat pointless, considering their brevity, sections on morphology, biology, and protection. But the main bulk of the book consists of the species descriptions and illustrations. Each species is given one to several pages, with a little text, a small but adequate distribution map, and usually several photographs. The pictures are generally of good quality, although a few are over-enlarged, and show nearly all the orchids of France, together with quite a few that occur just over the borders in Spain, Italy, and elsewhere. The author, unfortunately, is obsessed with showing freaky flowers or those which are partly obscured by insects or spiders, which is a little annoying as this has resulted in one or two species not being represented by a normal *"*standard*"* example. The taxonomy too is rather quirky, definitely idiosyncratic, and for the beginner, to be taken with a pinch of salt: for instance, *Ophrys drumana*, as good a *"*species*"* as most *Ophrys*, has disappeared entirely from the scene, without any explanation. If you desire a good, up to date, and generally acceptable account of the taxonomy of these orchids, then get the book reviewed above instead; or as well!

Dispersed throughout the book are some splendid site photographs, some of them as two page spreads, which are really effective, especially if you know the sites concerned! And several large spreads of photos of putative hybrids; though how one can claim a hybrid between two closely related (possibly indistinguishable) and controversial taxa beats me! Like many modern French orchid books, this one is good value, just don't take it too seriously. It can be obtained through the Orchidophile organisation (see review above) for €45.50 + 19.90 P&P, and probably elsewhere.

Reviewed books are available from Summerfield Books, see advert page 62

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