

Journal
of the
HARDY ORCHID SOCIETY



Vol. 3 No. 3 (41) July 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).

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Front Cover Photograph

Hybrid between *Orchis purpurea* and *O. simia* (*Orchis* × *angusticuris*)
photographed by Mike Gasson (see Editorial Note page 67)

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Editorial Note

There is something of a hybrid theme in this edition, both within the articles and some of the Plant Show winners. In addition, the orchid grapevine went into overdrive during May with news of several UK hybrids between *Orchis purpurea* and *O. simia*. Our Chairman was sufficiently enthused to circulate an e-mail to Committee Members with the subject "Bastards!". Having been away for a week, I opened this with heavy heart fully expecting news of some dastardly uprooting of a rarity, so it was with great joy that I read of this exciting development. An article on "anthropomorphic" *Orchis* hybrids is under development for a future Journal, but it seems appropriate to celebrate *Orchis x angusticuris* right away, hence the picture of this beautiful addition to British orchids on the front cover. One serious point is that the intense interest in these hybrid orchids led to significant damage to the site, with at least four non-flowering hybrid or parent plants being crushed into what became a surrounding of mud. This emphasises the need for care at vulnerable sites. Hopefully, now that their flowering is at an end, the site will be allowed to recover so that we have a chance of enjoying these hybrids in flower next year.

HOS AGM and Spring Meeting

The Chairman welcomed the 90 or so members present, thanked the Officers and Committee for their support over the previous year, and reported that 2005 had been yet another very enjoyable year for the Society. The year started with a questionnaire, to which an encouraging number had responded with a lot of helpful information. The Spring and Autumn Meetings had been well attended, but numbers at

Harlow Carr were somewhat down. If attendance there is not higher this year, we may discontinue that event. The photo show goes from strength to strength, with even more entries of superb quality. To try and encourage more novices to enter the plant shows, we have published some advisory notes on what a judge looks for when faced with a bench full of hardy orchids. Last year's field meetings were all fully booked and greatly appreciated, so even more are planned for this year. Most are run by non-committee members - we can always accommodate more volunteers! Under Mike Gasson's editorship, the HOS Journal is produced by a new printer, saving us a little money and giving us better control over the printing of colour pictures. Conservation work has continued, the major practical task being the rescue of several hundred Bee Orchids threatened by housing development near Gloucester. Publicity has been much to the fore. The website, maintained by Bill Temple, was visited over 10,000 times in the past year, and Maren Talbot has organised displays at the Raby Castle and the Newbury orchid shows. Several members have delivered important lectures on hardy orchids, and also contributed to articles in the AGS Journal, Country Living and the Saga Magazine.

The Treasurer, Rosemary Hill, reported that the surplus of £1485 for the year was due largely to the increased membership and the reduced cost of printing the Journal. The Accumulated Fund stood at £9108, of which £265 had been assigned to the new Capital Equipment fund. In view of the healthy state of the finances, she recommended that subscriptions should remain unchanged.

The Membership Secretary, Maren Talbot, reported that the number of memberships (both individual and family) now stood at 486, compared with 432 a year ago.

The Chairman thanked the three retiring Officers (Rosemary Hill, Maren Talbot and Chris Birchall), prior to the election of the new Officers and Committee Members (see inside front cover for details). Because of increasingly stringent legal constraints on professional audits, our Auditors (Nigel and Maureen Denman) were no longer able to continue. The Chairman thanked them for their several years of service, and welcomed Tony Beresford who had volunteered to take over the task.

Following the AGM, we were entertained by Mike Powell's talk on "The Cultivation of non-hardy Terrestrial Orchids", and Phil and Gwen Phillips' twin-screen presentation of "A Return to Mediterranean Orchids". Norman Heywood, who had judged the Plant Show, then walked and talked us through the winning entries, prior to the much appreciated innovation of four talks using "5 slides in 5 minutes". Richard Bateman (whose idea this was) showed us *Anacamptis papilionacea* hybrids from Cyprus (see page 80); Malcolm Brownsword talked about outdoor cultivation of orchids in large containers; Colin Clay showed a sequence of enormously magnified pictures of the interaction of fungi with orchid seed; and Tony Hughes showed some candid pictures of HOS members on Field Trips. Finally,

Richard Bateman, Bill Temple and Richard Manuel faced up to the audience's questions in a lively "Ask the Experts" session.

HOS Harlow Carr Meeting Saturday 9th September 2006

As usual we are holding our "Northern" meeting in the Study Centre at the RHS Harlow Carr Garden. An application form for the meeting is included with this Journal, and the fees are the same as last year! Please note that advanced booking is essential. Space in the Study Centre is limited to about 60 people, so places will be allocated on a "first come, first served" basis.

At Kidlington our new "5 slides in 5 minutes" session was very successful, so will be repeated here. If you would like to bring 5 slides and have your moment of glory, please let Tony Hughes know beforehand - wacky topics are welcome!

Harlow Carr Garden is in Crag Lane (HG3 1QB), just off the Otley Road (B6162) on the west side of Harrogate. You will be required to show your HOS Membership Card to get free entry to the garden for the meeting.

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

- 10.00 a.m. Doors Open; Tea/Coffee; Sales Tables.
- 10.45 a.m. Chairman's Introduction
- 11.00 a.m. Sidney Clarke "Mediterranean Orchids - Part 1"
- 12.00 David Hughes "Flowers on the Drakensburg, particularly Orchids"
- 1.00 p.m. Lunch
- 2.00 p.m. Malcolm Brownsword "Growing Pleiones"
- 3.00 p.m. Various speakers "5 slides in 5 minutes"
- 3.30 p.m. Tea/Coffee
- 3.45 p.m. Sidney Clarke "Mediterranean Orchids - Part 2"
- 5.00 p.m. Meeting Closes

Conservation Officer's Report Bill Temple

This year members of the Hardy Orchid Society have been involved in a number of projects, the first being the *Epipactis 'youngiana'* project which started last year and is ongoing. This project is to raise seedlings from *E. youngiana* in order to increase the population at a Scottish site, and provide specimens for research.

The second project, which has not yet started, but has been authorised, is the raising of seedlings of *Himantoglossum (Barlia) metlesicsiana* from seed with the view to increasing the population on their volcanic home island and possibly introducing them to another island. Further details of this project are given in the following article.

There are two other projects under discussion, which may or may not happen. In addition to this, some volunteers moved about 700 bee orchids from a former RAF site to three new locations in the same parish in Gloucestershire.

Conservation News

Bill Temple

The Hardy Orchid Society, in conjunction with the Grupo Orquideofilo Canarias (GOC), has undertaken a conservation project on *Himantoglossum (Barlia) metlesicsiana*. This orchid grows on one side of a dormant volcano, in a narrow altitude range on a single island, and is therefore rather vulnerable. In the past there has been at least one instance of 25 plants being illegally dug up, presumably the plants being sold on the internet in Germany and England a couple of years ago.

The GOC applied for permission to collect 3 seed pods for members of HOS to use to try to germinate. The Canaries Cabinet passed a resolution to grant this application, a permit was issued and we have now received the seed pods. The contents of the seed pods have been distributed to 4 members of HOS who will attempt to germinate them.

The conditions applied to this project are that 80% of any resulting seedlings must be returned to the Canarian Government, and the Government has specified that the other 20% of the seedlings MUST remain in the possession of members of the HOS (i.e. growers may only sell them within the HOS). The Canarian Government also stated that they require a report (this is normal practice) and a list of the names and addresses of all those people who have a plant or plants of *H. metlesicsiana* in their possession as a result of this project. This should be regarded as a measure of how seriously the Canarian Government regards the illegal collection of plants or seeds.

If you see this species for sale in a catalogue or on the internet, please inform the Conservation Officer, and do not buy them unless the seller can supply a valid Cabinet Resolution number and Permit number (as far as I am aware no other permits for the collection of seed or plants of this species have been issued).

HOS Plant Show 30th April 2006 Eric and Doreen Webster

This year's plant show was a great success but would have benefited greatly from a few more plants on the bench. A total of thirty one plants from nine exhibitors left a few empty spaces. Unfortunately the late spring meant there were no *Dactylorhizas*. Perhaps, next year the weather will be more kind and the plants more plentiful.

Richard Manuel won the Best in Show with a handsome plant of *Serapias* x *intermedia* (*S. lingua* x *neglecta*), and also won the aggregate for the highest number of prize points. Unfortunately, he could not be awarded the Banksian Medal as it cannot be won by the same person two years running.

Many thanks to those who contributed to the non-competitive exhibits, particularly the Cypripedium Collection brought by Jonathan. Don't forget that showing plants is not all about winning prize stickers. It is also a showcase for plants, which other people may like to see, and a chance to compare plants of the same species or genus to show the variability and possibly the effects of differing cultivation techniques.

Once again Doreen and I would like to those members who helped to set up the show and clear away afterwards, especially Neil Hubbard who always spends most of the day helping. Last but certainly not least, our grateful thanks to Norman Heywood for judging and commenting on the plants exhibited.

Plant Show Results

Class 1 Six pots hardy orchids, distinct varieties. (1 entry)

1st Richard Manuel *Serapias neglecta* x *Anacamptis papilionacea* (plate 1); *Ophrys lutea* x *speculum*; *Ophrys* x *heraultii* (*Ophrys tenthredinifera* x *speculum*) (plate 4); *Ophrys* x *emmae* (*Ophrys speculum* x *bertolonii*) (Plate 6); *Ophrys tenthredinifera* x *kotschyi* (plate 3); *Anacamptis* (*Orchis*) *papilionacea* (plate 2).

Class 3 Three pots native European (non British) orchids, distinct varieties. (1 entry)

1st Barry Tattersall *Serapias carica* (plates 7 and 8); *Ophrys speculum* (plate 5); *Orchis italica*.

Class 4 Three pots non-European orchids, distinct varieties. (1 entry)

1st Peter & Kath Fairhurst *Pterostylis* 'Hoodwink' (plates 11 and 12); *Pleione grandiflora* (plate 9); *Pleione* 'Captain Hook' (plate 10).

Class 5 Three pots hardy orchids distinct, any country of origin. (1 entry)

1st Barry Tattersall *Anacamptis* (*Orchis*) *longicornu* (plate 14); *Orchis*

quadripunctata (plate 15); *Serapias orientalis* (plate 13).

Class 6 One pot native British orchid. (1 entry)

1st Barry Tattersall *Orchis (Aceras) anthropophorum* (plate 16).

Class 7 One pot native European (non-British) orchid. (1 entry)

1st (Best in Show) Richard Manuel *Serapias × intermedia* (*Serapias lingua* × *neglecta*) (plates 17 and 18).

Class 8 One pot non-European hardy orchid. (2 entries)

1st Malcolm Brownsword *Pleoine aurita* (plate 24).

2nd Richard Manuel *Caladenia* ‘Harlequin’.

Class 10 One pot *Orchis*, *Anacamptis* or *Neotinea*. (2 entries)

1st John Haggart *Orchis (Aceras) anthropophorum*.

2nd Richard Manuel *Anacamptis (Orchis) papilionacea × morio* (plate 20).

Class 11 One pot *Ophrys*. (3 entries)

1st Richard Manuel *Ophrys cretica* var. *ariadne* (plate 19).

2nd Malcolm Bownsword *Ophrys lutea*.

3rd John Haggart *Ophrys fusca*.

Class 12 One pot *Serapias*. (3 entries)

1st Alex Jeans *Serapias neglecta* (plate 21).

2nd Richard Manuel *Serapias neglecta*.

3rd Keith Ballard *Serapias neglecta*.

Class 13 One pot *Cypripedium*. (2 entries)

1st Michael Powell *Cypripedium formosanum* (plate 23).

2nd Doreen Webster *Cypripedium* ‘Michael’.

Class 14 One pot, any other genus of hardy orchid. (2 entries)

1st Doreen Webster *Calanthe bicolor* (plate 22).

2nd Malcolm Brownsword *Bletilla striata*.

There were no entries in:

Class 2 Three pots native British orchids, distinct varieties.

Class 9 One pot *Dactylorhiza*.

A selection from the winning plants in the show are presented on the following three pages of photographs. The plate numbers in the top left corners identify the plants which are indicated in brackets in the above list of winners. All photographs by Mike Gasson except Plate 6 by Richard Manuel.





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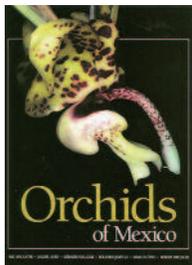


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Orchids of Mexico

Book Review by Richard Bateman



Orchids of Mexico by Eric Hagsater, Miguel Soto, Gerardo Salazar, Rolando Jimenez, Marco Lopez and Robert Dressler. 2005. Instituto Chinoín, Mexico City. 304 pp. ISBN 968-7889-08-X. Price \$168 (available from nhbs Environmental Bookstore www.nhbs.com at £89; or \$100 plus shipping by email to redactamex@yahoo.com.mx)

We all readily accept that the Mediterranean-climate floras of Australia, South Africa and southern South America include orchids that are the preserve of the HOS, but surely Mexico, straddled by the Tropic of Cancer, lies beyond our remit? By no means. We have here a country the size of western Europe, equally geologically complex, bounded by the Pacific to the west and the Caribbean to the east, and reaching 5,700 m in altitude. This leaves plenty of room for terrestrial orchids of temperate climates, especially given an orchid flora of an estimated 164 genera and 1200 species.

This stunning book covers all but two of the genera and fully one third of the species. The 660 colour photos are of high quality and the reproduction does them full justice; some spread over two facing pages. They range from close-ups of individual flowers to evocative panoramas of orchid habitats and even highly informative satellite images. The exemplary layout is facilitated by high paper quality and outsize pages (33 x 25 cm).

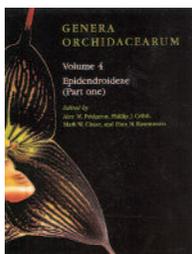
So this is just a superior picture book? Well, hardly. The comprehensive text has been compiled by six orchid experts of considerable reputation and complementary skills, so that (fairly) hard science sits comfortably alongside a detailed history of the Aztec's vanilla industry. Spanish and English versions were written simultaneously and with care, so that the text reads fluently (if sometimes a little repetitively).

The book begins with chapters on the natural history of orchids, orchids and people, and the Mexican landscape, and appropriately closes with a chapter on conservation that makes it clear that, as in most countries, habitat destruction is the primary threat to the well-being of the orchid flora. This is followed by a modest bibliography and taxon (but no subject) index. Sandwiched between are eight chapters that are the meat of the book; each covers the orchids of a specific mapped biome, supported by background information such as typical annual weather profiles. Biomes covered include rain forests, dry forests, savannahs, wetlands, temperate forests and cloud forests. The orchid floras of grasslands/alpine and, less intuitively, deserts hold the largest proportion of species of likely interest to us.

The hardy orchids featured have a typical North American complexion: Orchidinae is represented by *Platanthera/Piperia*, Habenariinae by *Habenaria*, and Epidendroideae by old friends such as *Bletia*, *Corallorhiza*, *Malaxis* and *Liparis*. But these genera recur throughout the book in an astonishing array of forms (e.g. the daisy-like *Liparis vexillifera* on p. 218) and habitats (e.g. *Habenaria repens* floating in a raft of water hyacinths on p. 163). Perhaps most startling is the diversity of spirantheid orchids. The European *Spiranthes* and *Goodyera* are joined by a panoply of less familiar genera that also typically have dense spikes of small flowers but experiment with a myriad of colours, the oranges and reds being especially striking.

In summary, this is one of those rare books that can be treasured for both its aesthetics and its content. Heavily subsidised by a far-sighted Mexican pharmaceutical company, it constitutes stunningly good value, even allowing for the fact that the English language version is a little more expensive than the Spanish. Authors, publishers and sponsors are all to be heartily congratulated.

Genera Orchidacearum 4 Book Review by Richard Bateman



Genera Orchidacearum volume 4: Epidendroideae (Part 1), edited by Alec Pridgeon, Phillip Cribb, Mark Chase and Finn Rasmussen. 2005. Oxford University Press. 672 pp. ISBN 978-0-19-850712-3. Price £125.00 (see Summerfield Books advert on page 95)

Heavier still than *Orchids of Mexico* (2.7 kg versus 2.3 kg) is the latest volume of *Genera Orchidacearum*, which compensates for its smaller page size (28 x 20 cm) by having twice as many pages. With 200 high-quality colour orchid photographs arranged in 48 plates, this volume would have appeared lavishly illustrated had it not been pitted against the Mexican orchid flora. Having said that, each genus is represented by a fine full-page set of line drawings presenting the details of a representative species.

Indeed, the format of this ultimate orchid monograph will have become familiar to readers by now, as volumes of steadily increasing size have appeared biennially since 1999. The first two volumes were leavened with introductory essays covering specific topics in orchid systematics, but subsequent volumes have been purely monographic. The taxonomic framework for these volumes has been provided by the last decade of DNA-based phylogenetic studies, though these play a relatively subdued role in much of the volume, where the phenotype dominates the genotype. A typical well-founded genus entry has section headings for morphology, distribution (backed up by a genus-level halftone distribution map), anatomy, embryology,

seed morphology, palynology, cytogenetics, phytochemistry, phylogenetics, ecology, pollination, (economic) uses, cultivation, taxonomic notes and relevant literature. Particular sections for particular taxa have been written by the appropriate specialists, giving these works the authority of cutting-edge research. The ensemble is supported by a selective glossary and comprehensive bibliographies and indexes.

With regard to genera of greatest interest to HOS members, *Cypripedium* was treated in volume 1 (Apostasioideae, Cypripedioideae), while the bulk of the Mediterranean-climate orchids were covered in volume 2 (Vanilloideae, Orchidoideae less the spiranthoids). The spiranthoids finally surfaced in volume 3, and volume 4 completes the treatment of the European orchids by tackling the Neottieae, an evolutionarily controversial grouping that includes *Cephalanthera*, *Limodorum*, *Aphyllorchis*, *Neottia* and *Epipactis*. These treatments are likely to extend the controversy surrounding the group. In particular, a nine-page article beginning on p. 487 (modesty prevents me from identifying the authors!) amalgamates our old familiar *Listera* into *Neottia*, a necessary step in order to generate a natural, evolutionarily cohesive group. The mycoheterotrophic *Neottia s.s.* might contrast vegetatively with the photosynthetic former *Listera*, but even the briefest examination of their flowers reveals strong similarities. The associated text transfers the focus of discussion from the genus to the species level, especially for *Epipactis*, thereby exemplifying one of the potential weaknesses of these volumes; the strongly contrasting levels of information available for different genera. Also treated in this first volume on subfamily Epidendroideae are *Corallorhiza* (placed under Calypsoeae), *Epipogium* (placed under Nervilieae), and *Malaxis*, *Liparis* and *Hammarbya* (placed under Malaxideae). Altogether, 209 genera of the largest subfamily in Orchidaceae are covered here, a Herculean task indeed.

This excellent multi-volume monograph, famously supported by the Sainsbury Foundations, has effectively become the supraspecific yardstick for orchid systematics worldwide, having been adopted formally by the RHS and, in effect, by the HOS. Fortunately, there is no such thing as the “last word” in systematic biology, but I will hazard a guess that taxonomic rearrangements above the species level will be far fewer in the wake of this definitive series. It will, however, be interesting to see how much revision of the taxonomy of the early volumes will be needed in the last volume, and how many common threads elucidating orchid evolution will ultimately emerge from this remarkable international collaboration. I guess we will have to wait until 2009 to find out.

In the meantime, this monograph merits the same high level of acclaim as the Mexican flora. Indeed, the main difference is the price; sponsorship appears to stretch rather further in Mexico than in the UK.

An Intergeneric Cross between *Serapias* and *Ophrys*

John Haggar

In 1999, I cross-pollinated a cultivated specimen of *Serapias lingua* with the pollen from a purchased specimen of *Ophrys sphegodes* of Continental origin. Viable seed was produced and was subsequently sown on Malmgren's medium. Seedling growth was uneventful and the protocorms produced leaves and roots *in vitro*. The small plants were transplanted to fresh medium every two to three months whilst in growth.

By the summer of 2001, small tubers had formed in the medium. The plants, which were still in leaf, were deflasked and potted up into damp compost which had been heat sterilised and subsequently inoculated with a culture of fungus T&M (obtained from the Hardy Orchid Society seed bank). Subsequent growth was slow, but every year the plants increased in size and flowers were first produced in the spring of 2004.

Although intermediate in form between the two parents, the flowers of the hybrid appear to resemble the maternal parent more closely than the pollen parent. They bear large and very wide tongue-like, plum coloured labella with purple edges that fade into blue-grey centrally. The other petals and sepals are long, drooping and greyish green and effectively obscure the diminutive column. The plants are small in stature, like the *Ophrys* parent, and the leaves are intermediate in form.

The existence of this hybrid supports Richard Bateman's recently published work, which places *Serapias* genetically close to *Ophrys*. Further cross-pollinations between *Serapias lingua* and other *Ophrys* species, such as *Op. tenthredinifera* and *Op. speculum*, have failed to produce viable seed. This would support the notion that *Ophrys sphegodes* is a primitive representative of the genus. A plant believed to be a cross between *Serapias* (probably *lingua*) and *Ophrys sphegodes* var. *mammosa* was illustrated in Nelson's 1962 monograph but remained unnamed.

x *Seraphrys* would appear to be the most suitable name for this new hybrid genus.



Hybrid between *Serapias lingua*
and *Ophrys sphegodes*.
Photo by John Haggar

The Origin of (Pseudo)Species by Means of Natural Selection: a Cypriot Conundrum

Richard M Bateman

During four days of fieldwork in south-central Cyprus in late March 2006, Barry Tattersall, Richard Manuel and I succeeded in locating no less than 36 “Delforgean” orchid species plus several hybrid combinations. This satisfying result reflected Barry and Richard’s considerable prior knowledge of the island, together with judicious use of the extensive altitudinal range offered by the island and of a hired four-wheel drive vehicle.

Both the altitudinal variation and the robust vehicle came to the fore when we attempted to survey one of the more species-rich but also more remote orchid localities on the island, an area of open scrub and sparse pines in a geomorphological basin containing the lake created by the Dhypotamos Dam (Fig. 1). The excitement occurred in part because we opted to approach the site from the west, rather than selecting the gentler (but nonetheless still challenging) incline from the north. The locality, overlooked by rather suggestive twin peaks, is featured prominently (if somewhat ambiguously) in “*The Orchids of Cyprus*” (Kreutz 2004), partly because it still supports modest populations of *Orchis punctulata* (Fig. 2) and *Ophrys kotschyi* (Fig. 3). However, it is perhaps most famous as the only site on Cyprus known to have yielded *Anacamptis* (*Orchis*) *caspia*. This is a dubiously distinct segregate of *A. papilionacea* (also known as var. *cyreniaca*), characteristic of north-east Africa and the Middle East, that is distinguished by a small, boldly marked labellum. Several Cypriot plants photographed



Fig. 1 Orchid locality west of Dhypotamos Lake, Cyprus.
Photo by Richard Bateman



Fig. 4 Mixed stand of pure *Anacamptis syriaca* (pale flowers) and hybrids with *A. caspia* (darker flowers).
Photo by Richard Bateman

in 2002 were illustrated by Kreutz (2004), including that shown here in Figure 5.

However, as noted by Kreutz (and evident in the full-page plate on his p. 304), plants of *A. caspia* occurred intermingled with a healthy population of *A. syriaca* (Fig. 6). This eastern Mediterranean segregate of *A. morio* is one of the most common orchids of southern Cyprus, and at Dhypotamos it has extensively crossed with *A. caspia* to generate a hybrid swarm (Fig. 4). The wide range of floral morphologies in the population (compare Figs. 7 and 8) suggest either that the primary hybrids have back-crossed (introgressed) with their parents or that crosses have occurred that involve each of the two parental species as the mother. Mothers tend to contribute more to the morphology of orchid hybrids than do fathers, as illustrated by a study of another Mediterranean *Anacamptis* hybrid by Bateman & Hollingsworth (2004). What was most striking about our 2006 visit was that we were unable to find any flowering individuals that we could convince ourselves represented pure *A. caspia*. Given the enthusiastic flowering of both *A. syriaca* and the various hybrids, it seems likely that *A. caspia* has already been lost to Cyprus (or, at best, very soon will be lost).

This conclusion in turn led to two further science-related thoughts, the first pragmatic and the second more generalized and conceptual. Pragmatically, it may still be possible to achieve my original objective (determining the evolutionary relationships of *A. caspia*) by analyzing the hybrids. They will contain the plastid and mitochondrial genomes of the mother only, but the nuclear genome (i.e. the chromosomes) should con-



Fig. 2 *Orchis punctulata*,
Dhypotamos.
Photo by Richard Bateman



Fig. 3 *Ophrys kotschyi*,
Dhypotamos.
Photo by Richard Bateman

tain equal numbers of genes (including our favourite region for DNA sequencing, ITS) inherited from each parent. And since we can still analyze the genes of *A. syriaca*, these can readily be identified and any genes not consistent with *A. syriaca* will by default have been inherited from *A. caspia*. Hence, these hybrids still offer considerable potential insights.

Moving on to the more general point, it seems reasonable to assume that *A. caspia* has been a victim of natural selection, proving less well adapted to the vicissitudes of the site than *A. syriaca* or their hybrid progeny. This realization in turn caused me to wonder what our reaction to these hybrid plants would have been had we not read Kreutz's book; what if we had been unaware of the previous existence at the site of *A. caspia*? I suspect that there would have been a strong temptation to recognize this extensive and distinctive population as a new species (or subspecies) of *Anacamptis*. Moreover, yielding to this temptation would likely have converted the site into a mecca for orchid enthusiasts seeking to expand their lists of Mediterranean species observed in the wild by adding another (non-existent) species to their tally.

I have witnessed similar evolutionary processes taking place near my former home in St Albans over the last 25 years, where flooded gravel pits that in my youth supported healthy populations of both *Dactylorhiza fuchsii* and the moisture-loving *D. praetermissa* have become progressively drier and so now yield only *D. fuchsii* plus various hybrid combinations with *D. praetermissa*. I am especially tempted to speculate on the implications of the "disappearing parent" phenomenon for many of the 252 species of *Ophrys* recognized in the most recent edition of Delforge (2005). But that, as they say, is another (*Just So*) story.

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Figures 5 to 8 (opposite page)

Anacamptis flowers from the Dhypotamos site: Figure 5. *A. caspia*; Figure 6. *A. syriaca*; Figures 7 and 8. Morphologically contrasting hybrids between *A. caspia* and *A. syriaca*. Photos by Richard Bateman except Figure 5, which was kindly supplied by Karel Kreutz as originally published in *Die Orchideen von Zypern* (bottom left image of the plate on p. 306).

Figure 5



Figure 6



Figure 7



Figure 8



Suffolk Roadside Nature Reserves

Mike Gasson

One of the pleasures of orchid hunting in France is the ease with which interesting plants can be spotted in the grass verges whilst driving along characteristically quiet and straight rural roads. However, here in the UK there are some interesting sites on our own roadside verges. Over the past two seasons, I took an interest in the Roadside Nature Reserves that are jointly managed by the Suffolk Wildlife Trust and Suffolk County Council. My interest was first aroused by reading Martin Sandford's useful county orchid flora "*The Orchids of Suffolk*" (Sandford, 1991). This highlights important roadside records for the Bee Orchid variants *Ophrys apifera* var. *chlorantha* and *O. apifera* var. *trollii*, as well as the fact that protected roadside verges represent the stronghold for the Man Orchid, which is quite rare in the county.

In addition to using hints from Martin Sandford's book, I contacted Suffolk County Council who proved extremely helpful. I was surprised to find that they maintain an ecologist on staff, and it was easy to obtain an Excel spreadsheet with a complete record of the Suffolk Roadside Nature Reserves. This provided precise grid references and details of recent surveys of the sites. In practise these sites are very well identified with white marker posts at each end of the protected areas. The key conservation step is to prevent verge mowing from destroying the flora, and the protected areas are easy to spot due to their relatively lush vegetation.



Bee Orchid with an unusual lip pattern on a protected roadside verge near Great Waldingfield.

Photo by Mike Gasson

During 2005 and 2006 I tracked down several sites that seemed to promise orchid interest. Of five Roadside Reserves with Man Orchid records, I found *Orchis (Acreas) anthropophorum* at three of them; near to the villages of Flowton, Little Blakenham and Wattisham.

Bee Orchids proved to be somewhat disappointing with several blanks. I had the feeling that in some cases the rich vegetation may have been counterproductive for this species. Indeed at the one site near Great Waldingfield *O. apifera* were present on a wide verge that had been cleared to provide better vision for motorists. Here Bee Orchids grew in profusion on what was very largely bare earth. The site was notable for the pres-

ence of a plant with unusually marked flowers (see photograph) in which the normal lip pattern was reduced to a pair of vertical yellow stripes. There is a rather similar flower illustrated on page 194 of "*Illustrations of British and Irish Orchids*" (Turner Ettliger, 1998) and identified only as "an aberrant lip pattern".

Another interesting Roadside Nature Reserve near to Cookley is noted for a Wasp Orchid record, first made in 1990. This site was curious as the protected verge supported a lonely Pyramidal Orchid, whereas on the opposite unprotected side several Bee Orchids were flourishing almost within a field of Rape. When I visited in 2005 one plant carried a mix of normal flowers at the base of the spike with apparent Wasp variants towards the top, a phenomenon described by Summerhayes (1986). As well as the *Orchis* species mentioned above, Pyramidal Orchids are present in sufficient numbers to give a purple tinge to some areas later in the season.

Roadside Nature Reserves were pioneered in Suffolk, but they are found in other counties. At one site in my local Norfolk, Early Purple Orchids grow alongside an area of woodland, and similar schemes elsewhere in the country may offer orchid interest.

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Man Orchids on a protected roadside verge near Little Blakenham.
Photos by Mike Gasson

Orchid Conservation Activities on the Isle of Islay Richard and Mavis Gulliver

In September 2005 at Portnahaven on Islay, part of an area with moderately abundant populations of three taxa of orchids was to be cleared of the existing vegetation to allow the construction of a waste water treatment works. This work is part of a major scheme to upgrade the sewerage treatment and disposal facilities on Islay which is being undertaken by Scottish Water Solutions. The pipeline from the works to the sea will be inside a tunnel drilled through the rock. The three taxa are *Dactylorhiza maculata*, *D. purpurella* and *D. maculata* × *purpurella* (*Dactylorhiza* × *formosa*). Most of the activities described in this article were carried out in September 2005 when the plants were in fruit. Only *D. maculata* and *D. maculata* × *purpurella* were identified at the site at this stage in the season. Figure 1 illustrates the general nature of the site.



Figure 1 (left) Part of the environs of the proposed Waste Water Treatment Works at Portnahaven in July 2004 (i.e. the year prior to construction). The site of the future works is just to the right of the right hand road-side fencepost.

Figure 2 (right) Mavis Gulliver moving hybrid plants to the zone around a juniper which is about to be fenced. (7 September 2005).

After the construction work has been completed, plants of all three taxa may recolonise from seed blown onto disturbed areas of soil, or develop from buried seeds or from protocorms. As some existing plants were in the path of the development, the following conservation activities were undertaken.

- 1) Fencing-off of two juniper plants together with the nearby *Dactylorhiza* taxa to prevent damage from construction vehicles moving over the site.
- 2) Movement of some plants and re-establishment in the fenced zones (Figure 2).
- 3) Movement of some plants to the authors' semi-wild garden at Port Ellen on Islay to allow replanting at the original site when all the work is finished.
- 4) The gathering of stems bearing capsules (which subsequently matured and shed seed within paper envelopes). When all the construction work is complete, some of this seed will be scattered on site. This site is adjacent to the sea and it is possible that a considerable part of the seed output from the plants present *in situ* is either blown some distance inland or blown out to sea.
- 5) Placement of seed in the Hardy Orchid Society (HOS) seed bank so that plants can be grown-on in several different parts of the United Kingdom. This ensures against the possibility that a major event might eliminate orchid plants at the site and in the immediately adjacent area.

Material from these three taxa is now available in the HOS seed bank. Capsules and parts of the stem are included in the paper envelopes to allow the morphological details to be examined if desired. In the case of the hybrids (16 plants) there are notes on the envelope giving details on: plant code numbers; the date of harvesting at maturation; whether the original plant was stout/robust, intermediate or slender; and whether in September/October the "inflorescence" (actually the mature stem and associated capsules) was stout/robust, intermediate or slender. The robustness categories are general in nature. Sometimes capsules of more than one category occurred within one "inflorescence".

Details of the source of seed of the three taxa submitted to the seed bank:

- A) Sixteen plants of the hybrid orchid (*D. maculata* × *purpurella*), all from the Portnahaven site.
- B) Fourteen plants of *D. maculata* from the authors' garden at Port Ellen. (Only one plant of *D. maculata* in fruit was gathered from Portnahaven in September 2005). Most "inflorescences" at Port Ellen were slender or intermediate. One was stout.
- C) Six plants of *D. purpurella* from waste ground near to Kilnaughton old church burial ground, Port Ellen, Isle of Islay. When gathered all capsules were brown and were on totally dead stems, and all were robust. No plants from the Portnahaven site could be identified with certainty as *D. purpurella* (rather than the hybrid) in

September 2005.

The transplantation process has allowed an examination of the roots and soil. Figure 3 illustrates the divided tuber and root system, and Figure 4 shows three protocorms of the hybrid.



Figure 3 (above)

The divided 'new' tuber (lobes all horizontal) and roots of the hybrid orchid with the white bud which will develop into next year's stem or vegetative plant. The dark brown roots are from the old (i.e. current year's) tuber. 10 September 2005.

Figure 4 (below)

Protocorms of the hybrid orchid. The white buds will develop into the first shoot (bud very faint on the upper plant).



Photographs and/or descriptions of any plant grown from seed by HOS members would be most welcome. It will be interesting to see if the plants raised from seed and grown in favourable media differ in size or other attributes from the plants growing *in situ*.

The authors wish to express their gratitude to Scottish Water Solutions and Biwater Leslie for assistance with the project. The photographs are the property of the authors and must not be reproduced without their permission.

Orchids growing in the wild should not be rescued or relocated without the appropriate permission. Orchid seed should not be collected in the UK without the appropriate permission. Details are available on the HOS website. If in doubt ask the Conservation Officer, who may be able to assist or advise on the best time and method for relocation.

Pollination of European Orchids - Part 2

Tony Hughes

In Part 1 of this article, all of the species described have adopted the 3-fold strategy of attraction, comfort and reward. Now we shall consider a range of species where the rewards are less obvious, and deception and false promises are the rule. The following arguments apply to many European species, particularly in the *Orchis*, *Anacamptis* and *Dactylorhiza* genera, so I shall describe the Early Purple Orchid (*Orchis mascula*) as a typical example. The attraction is obvious - large showy flowers with a strong perfume - attractive if you fancy tom-cats! The lip makes a good landing platform. The flowers have spurs of middling length, well-matched to the length of tongue of many bumble bee species. So a bee visits the flower and feels quite comfortable sitting on the lip and poking its tongue into the spur. Meanwhile the rostellum does its stuff and puts glue onto the bee's face, complete with caudicles and pollinia. But where is the reward? The spur does not contain nectar! This conundrum greatly puzzled Darwin, who performed numerous experiments and microscopic investigations. His conclusion, which apparently is no longer believed, was that the insect's mouthparts were able to penetrate the inner walls of the spur and suck out a nourishing liquid from the punctured cells. To support this, he observed that the spurs of these nectarless species were very much fleshier than the spurs of those bearing nectar, and the internal cell walls were much weaker. He watched bumblebees sitting on flowers of the Green-winged Orchid with their mouthparts in continual motion, consistent with piercing movements. He also dissected the spurs after they had been visited and saw minute marks that might have been puncture holes.

The current view, however, is that Darwin's interpretation was wrong. Instead, the bees are deceived into thinking that they will be rewarded with nectar, and they learn so slowly that they visit numerous flowers in their quest, often achieving very high pollination rates. This explanation had been proposed prior to Darwin's time but, with his philosophy on how evolution works, he found it most improbable. I know that I would love Darwin to be vindicated, but I'm afraid I don't know whether any convincing modern experiments have been performed.

The same uncertainty exists with most *Dactylorhiza* species regarding the rewards



Bee with pollen on
D. praetermissa
Photo by Tony Hughes

for the pollinators. In all the *Dactylorhizas* I have observed, bumblebees have been the pollinators, though a study in Austria observed that Long-horn Beetles dominated, and that they tended to chew at the little hairs on the labellum. There are many instances where pairs of *Dactylorhiza* species grow in close proximity and share the same pollinators. Cross-pollination between species is frequent, and often the genetic barriers to cross-fertilisation are weak, so many hybrids occur. One of the most common is the hybrid between *D. fuchsii* and *D. praetermissa*, aptly named *Dactylorhiza* \times *grandis*, on account of its spectacular vigour. Far less common, however, is the intergeneric hybrid between *D. fuchsii* and *Gymnadenia conopsea*. This is possibly the result of either a moth going to the Spotted Orchid in error, or a bumble bee visiting a Fragrant Orchid.

The Pyramidal Orchid (*Anacamptis pyramidalis*) is an example of flowers with long spurs but no nectar, but with two interesting adaptations to pollination by moths. Firstly the lip has two little plates near the base, which guide the moth's proboscis into the spur entrance. Secondly, the caudicles of the two pollinia are joined to a single sticky pad in the rostellum. This pad curls itself securely around the insect's proboscis, helping the pollinia to move into the right position to contact the stigmas of the next flower visited. Frequent pollinators in this country are the Burnet Moths, both 5-spot and 6-spot. Although the moths are denied a nectar reward, they repeatedly visit the flowers, many of which are pollinated. A possible explanation for their seemingly pointless behaviour is that they do not distinguish the orchids from similar flower heads, such as Knapweeds and Red Clover, which do con-



Hybrid *Dactylorhiza* \times *grandis*
Photo by Tony Hughes



Hybrid *G. conopsea* \times *D. fuchsii*
Photo by Tony Hughes

tain nectar. Similar suggestions have been made, rather less convincingly, regarding several other species. For example, the Sword-leaved Helleborine is said to be mistaken for white Cistus flowers, and the Red Helleborine for the Nettle-leaved Bellflower (in spite of the colour difference).

One of the most significant things that Charles Darwin didn't know concerned pollination in the *Ophrys* genus, which was first correctly described in 1916 by Monsieur Pouyanne, President of the Court in Sidi-Bel Abbes in Algeria. Although the following explanation is based on the Fly Orchid (*Ophrys insectifera*), the same applies to all but one species in the *Ophrys* genus. In the springtime, the males of a certain species of digger wasp emerge from their pupae a few days before the females. At the same time, the Fly Orchid flowers are opening, and giving off a perfume which is an almost exact replica of the pheromones of the female digger wasp. These young males are presumably attracted instinctively by the smell, and home in on the flowers. Although they have never seen a female wasp, they are very happy to land on the flower, where the shape and hairiness of the lip apparently matches up to all their expectations. So they attempt to mate with the flower. The mating position forces their heads against the rostellum, which promptly glues a pair of pollinia firmly in place. Their attempts at copulation are unsuccessful, so after a while they give up and fly off. But the pheromones are still in the air, and the urge to mate is strong, so they have another go with another flower, this time depositing pollen on the stigmas. Eventually they give up, but it is suggested that by the next morning they have forgotten the previous day's frustrations, so have



Five Spot Burnet Moth on
Anacamptis pyramidalis
Photo by Tony Hughes



Wasp on Fly Orchid
Ophrys insectifera
Photo by Barry Tattersall

another go. Fortunately, in a few days the females emerge and the wasps are able to mate properly. The orchids have benefited from this strange liaison, but what have the wasps got out of it? It is tempting to think that a footballing analogy applies - if you put in plenty of pre-season practice, your subsequent chances of scoring are greatly improved!

This story of “pseudocopulation” is repeated throughout the *Ophrys* genus, but with different species of orchid generating different perfumes and attracting different species of bee or wasp. In some groups, such as the relatives of *O. fusca*, the identification of the specific insect pollinators has enabled the separation of many species that are superficially very similar. In many species, the pseudocopulation position places the insect’s head against the column. However, in other species the insect adopts the reverse position. This occurs particularly with *O. lutea*, *O. fusca* and their close relatives.

The only *Ophrys* species that does not exploit pseudocopulation is our own Bee Orchid, *O. apifera*, where self-pollination is the norm. Very soon after the flowers open, the pollinia are released from the anther and they dangle around on very long and flexible caudicles. A slight breeze is all that is required to move the pollinia against the stigma, where they stick fast and self-pollination is assured. One can only guess what evolutionary path resulted in this situation, but one consequence of self-pollination is that any genetic mutations get frozen in, resulting in many spectacular flower forms for us to enjoy.



Anacamptis (Orchis) laxiflora x
Serapias neglecta
Photos by Tony Hughes

Most of the Tongue Orchids (*Serapias*) have a different strategy for attracting pollinators. The “tunnel”, formed by the upper petals, sepals and side-lobes of the lip,

appears very attractive to various small bees and wasps that nest in holes in twigs. It is usually the males which visit the flowers, possibly seeking females, but also sheltering during the night and on cold days. It has been shown that *Serapias* tunnels may be as much as 3°C warmer than the surroundings, so the visitors benefit from central heating as well.

S. lingua provides a “tunnel of love” - the shiny “coffee bean” protuberance hidden in the tunnel towards the base of the lip mimics the abdomen of a small female wasp, and the flower’s perfume mimics her scent, so the visiting male wasps attempt pseudocopulation, as in the *Ophrys* genus. *S. parviflora*, however, ignores insects entirely, relying exclusively on self-pollination. This may explain the large number of pale colour variants that we found in the Algarve.



Bee on *Anacamptis papilionacea*
Photo by Tony Hughes

The spectacular hybrid between *Serapias neglecta* and *Anacamptis (Orchis) laxiflora* is occasionally found where the two parents grow together in the south of France. Its occurrence indicates that, although the two species are from different genera and have little superficial similarity, they are sufficiently closely related for their genetic material to be compatible, and their insect pollinators occasionally get it wrong!

The Pink Butterfly Orchid (*Anacamptis [Orchis] papilionacea*) is another orchid with a spur that has no nectar, yet it is apparently very popular with various solitary bees. On cold days I have frequently seen bees sheltering within the hood of the flowers, just as with *Serapias*. Others claim that the males mark the flowers with their own pheromones in order to attract the females, using the area as a general mating ground. On a warm day, there can be a great deal of coming and going around the flowers, with plenty of pollinia being carried around.

The Lady’s Slipper Orchid (*Cypripedium calceolus*) has a different column structure, beautifully illustrated in the drawings of Franz Bauer (1758 - 1840), which have recently been reproduced on page 63 of “*Orchids of the British Isles*” by Foley and Clarke. The pollination strategy here is based on entrapment, with the “slipper” acting as the trap. There is no nectar, but insects of various sizes are attracted to the flowers and enter through the front opening of the slipper. The only way out is at the rear of the slipper, where they first brush against the stigmas and then have to squeeze past the rather friable and sticky pollen. There is no “superglue”, so only a dusting of pollen is removed by each visitor.

Finally, who could argue with this quotation from Charles Darwin's book: "The diversity of contrivances adapted to favour the intercrossing of flowers seems to be exhaustless". Thanks to Darwin, his contemporaries and his followers, we now understand much of what goes on, but there are many aspects of pollination that merit further explanation. Apart from all the issues relating to the orchids which do not provide an obvious reward to their insect visitors, can anyone explain how or why the Lizard Orchid, *Himantoglossum hircinum*, got its lip?

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