

Journal
of the
HARDY ORCHID SOCIETY



Vol 2. No.2 (36) April 2005

The Hardy Orchid Society

Our aim is to promote interest in the study of Native European Orchids and those from similar temperate climates throughout the world. We cover such varied aspects as field study, cultivation and propagation, photography, taxonomy and systematics, and practical conservation. We welcome articles relating to any of these subjects, which will be considered for publication by the editorial committee. Please send your submissions to the Editor, and please structure your text according to the 'Advice for Authors'. Visit the HOS website at: www.hardyorchidsociety.org.uk.

Raby Castle Orchid Fair

The annual Raby Castle Orchid Fair in Durham, held this year from 30th April to 2nd May, is likely to attract several thousand orchid enthusiasts. Among them will be our Secretary, Maren Talbot, who has kindly volunteered to organise a stand on behalf of the Hardy Orchid Society. This is a great opportunity for us to advertise our Society, so we would like our stand to be as attractive as possible. If any members are prepared to lend flowering plants, we can almost guarantee that they will be admired by thousands! Offers of help, please, to Maren Talbot, 01628486640, mtalbot@onetel.com.

Subscriptions 2005 -2006

Subscriptions are due on May 1st. We welcome payment by Standing Order: if you do not pay by this method and wish to, forms are available on the website or from the Membership Secretary, Maren Talbot. The subscriptions remain the same as last year; new members paying by Standing Order do not have to pay the Joining Fee.

Britain & Europe: Single Member £12.00; Family £15.00

All Other Countries: Single Member £16.00; Family £19.00

Joining Fee: Single Member - £ 2.50; Family £ 2.50

Back Issues of HOS Newsletters/Journals.

All copies of the Newsletter/Journal are still available. They can be obtained from Barry Tattersall, 262 Staines Road, Twickenham, Middlesex, TW2 5AR. Enquires welcome by email at . A full list of contents can be viewed on our web site.

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

Newsletter – Members - £2.50 per issue or £2 each for 4 or more issues.

Non-members - £3.75 per issue or £3 each for 4 or more issues.

Journal – Members - £3.50 per issue or £3 each for 4 or more issues.

Non-members - £5.25 per issue or £4 each for 4 or more issues.

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

Cover picture: *Epipactis cambrensis* : E.J. Spencer

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HOS Field Trips 2005

Three field trips, spread well over the country and covering an excellent range of likely species and hybrids, have been arranged for HOS members this year. Bookings for each trip should be made at least a couple of weeks in advance with the leader, who will inform you of the meeting place and time. Numbers may have to be limited, so “first come - first served” applies. The leaders may make a nominal charge to cover their expenses and donations to local conservation organisations.

Sat 30 April S. Dorset for Early Spiders and Dartford Warblers. Leader: Norman Heywood, 01747-838750. hardyorchids@supanet.com.

Sun 29th May Yockletts Bank and Park Gate Down, East Kent, for Ladies, Monkeys and lots more. Leader: Alan Blackman, 01474-564201. alan@ophrys.freeseerve.co.uk.

Sat 25 June S. Cumbria for *Leucorchis albida*, *Dactylorhizas*, *Gymnadenias* and hybrids. Leader: Alan Gendle, 01539-824691. alan.gendle@btopenworld.com

Conservation

Bill Temple

The society is involved in a conservation project – the *Epipactis 'youngiana'* propagation project. The partners in this project are –The Falkirk Area Biodiversity

Partnership, Scottish Wildlife Trust Falkirk members Group, Falkirk Council, Plantlife (Scotland), The Hardy Orchid Society and the Royal Botanic Garden Edinburgh. Our role in this partnership is to try to germinate seed of *E. 'youngiana'* and *E. helleborine* with hope that seedlings can be added to the existing population and that seedlings can be made available for scientific study. In order to research the problems of establishing asymbiotically germinated seedlings we are going to purchase 50 seedlings of *E. helleborine* and plant them in pots with tree seedlings and fungi.

Spring Meeting and AGM 24th April 2005

Roger Gelder, Meeting Organiser

The 13th AGM of the Hardy Orchid Society and Spring Plant Show will be on 24th April at Exeter Hall, Kidlington, near Oxford. An application form is enclosed with this Journal. Please return this form as soon as possible, so that catering arrangements can be confirmed. See the form for cost of attending. Members are asked to bring their membership cards with them and are reminded that subscriptions are due on 1st May. Please bring your competitive entries for the Plant Show (see next article for details). There should be room to display any other orchid related material you would like to exhibit, but please advise the organisers of any large displays you wish to bring. All proceedings are on the ground floor and cars may pull up to the rear of the hall for easy unloading of plants. "Trade" plant sales will be subject to a charge of £25 per table, payable in advance to Roger Gelder. A sales table for members' plants will be present, and people are encouraged to bring along their spare plants - not only orchids! Double labelling to indicate plant name and selling price should be adopted if possible. Sellers will be expected to donate 10% of monies to the Society.

We have an eminent range of speakers this year on a fascinating range of topics. Richard Bateman and Dion Devey will be leading us once more through the mysteries of tracing orchid evolutionary relationships. While fresh from publishing a range of books, including his most recent one on British Orchids, is David Lang who will be talking about the orchids of Sussex. Finally, in response to several requests, three members will tell us about how they succeed in growing orchids in their gardens. All in all a wide range of talk and activity to make it a great day!

Programme for Spring Meeting / AGM

09.00 - Doors open: Tea / Coffee; Plant Sales tables open; Staging of Plant Show entries before 09.45.

10.30 - Chairman's Introduction, followed by AGM.

Tea / Coffee

11.45 - David Lang - "Orchids of Sussex"

13.00 - Lunch.

14.00 - Plant Show Judge - Comments on winning plants.

14.15 - “Separating species and Inferring how they Originate”

Prof. Richard Bateman - “Platanthera bifolia and its relatives”

Dion Devey - “Ophrys fuciflora and its relatives”

15.15 - Tea / Coffee

15.30 - Tony Hughes, Bill Temple and Barry Tattersall - “Orchids in the Garden”

16.30 - Closing Announcements. Hall to be vacated by 17.00

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.

HOS Plant Show, 24th April, 2005

Eric Webster, Show Secretary.

The Annual Member’s Plant Show of the HOS will take place on the Saturday, 24th April during the Spring Meeting and the AGM at Kidlington. The Show rules and schedules are printed below so all you have to do is arrive before 9.45a.m. with your plant/s and we will help you to find a class to put them in. Pot size does not matter – if you can get it into the hall, you can show it! However if you know you will be entering some specific classes it would quicken things up for everyone if you give us a ring during the week prior to the show, with your entries. That does not mean you cannot enter extra ones on the day, or change some around if plants do not perform as you expect. If you haven’t shown before do bring a plant along and ‘Have a go’! We will give new exhibitors all the help they need. Photos of winning plants will appear on the Website, and possibly in the July issue of the Journal. The Best Plant in Show will be presented with the ‘Best in Show trophy’. If you have any other plants you think may be of interest to members, please put them in as a non-competitive exhibit.

Finally we hope to be able to award a Banksian Medal to the most successful exhibitor at the Plant Show. To be confirmed hopefully by the AGM.

The Hardy Orchid Society - Plant Show Rules

ELIGIBILITY – All classes are open to all members of the Hardy Orchid Society.

ENTRY FEES – No entry fees will be payable.

SHOW DETAILS – Advance entry is not required. Members will be informed in a Journal preceding the Show of the time by which exhibits must be staged, and the earliest time at which exhibits may be removed.

OWNERSHIP OF EXHIBITS – All exhibits must have been owned by the exhibitor for at least six months.

NUMBERS OF PLANTS PER POT – Unless otherwise stated, each pan may contain more than one plant, provided all the plants are of the same variety. However, when more than one flower spike is present, “uniformity” will be one of the judging criteria.

LABELLING – All plants should be correctly and clearly named. However, incorrect or unclear labelling will be considered only in a close competition.

JUDGING – The judge is empowered to withhold awards where entries are not of adequate standard.

PROTESTS – Any protest must be made by a member of the Committee within one hour of the opening of the hall after judging. The decision of the Committee will be final.

LIABILITY – While the Hardy Orchid Society will endeavour to take good care of all exhibits, it will not be liable for compensation for any damage or loss, however caused.

SCHEDULE OF CLASSES

1. Six pots hardy orchids, distinct varieties.
2. Three pots native British orchids, distinct varieties.
3. Three pots native European orchids, distinct varieties.
4. Three pots non-European orchids, distinct varieties.
5. Three pots hardy orchids, distinct varieties, 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* and related genera.
11. One pot *Ophrys*.
12. One pot *Serapias*.
13. One pot *Cypripedium*.
14. One pot, any other genus of hardy orchid.

Spanish Miscellany, 1967-2004: Part 2

Simon Andrew

'Part 2' begins with our 'Spanish area' No 4: **Catalonia**, or Cataluña.. This was largely new to us in 2004, and I am talking not about the actual coastal region, but an area some 50-100km inland, with altitudes between 500 and 1000 metres. We concentrated our attention here because we reckoned the timing would be right (early May) to find interesting species in flower - we were too late for the coast, too early for the mountains. And it proved a good choice, also giving us the opportunity to make comparisons with what we had recently seen in comparable areas of France just across the border. Our base was Cardona, a historic town about 60km NW of Barcelona and 700 metres up. Here, the parador, incorporated into a mediaeval fortress on a steep and isolated limestone hill, was a comfortable place to stay, and provided a good sample of the local orchids in the immediate surroundings. These included Man Orchid, *Orchis (Aceras) anthropophora*, in quantity (plants with both yellow and red lips), an 'Early Purple' type of *Orchis* which I think was *O. langei*, and *Ophrys sphegodes*, *O. lutea* and *O. fusca* all in abundance, plus one or two *O. scolopax* and *O. insectifera*. All of these were growing alongside a footpath round the base of the castle mound.

Our main excursion from Cardona was along a minor road joining the small towns of Súria and Balserena some 20km to the east, chosen from the map because it looked about the right altitude, well wooded and likely to be unmodernised. The latter was important, as reconstruction of country roads is proceeding at a tremendous pace in Spain, and the rebuilt roads completely do away with the attractive roadsides which are so often the best orchid habitats, and often make it almost impossible to gain access to the countryside beyond the rocky cuttings and deep ditches. We were just in time here - work had already started on straightening the most winding sections - but most of the road, with its surroundings, was still unspoilt. The countryside here was a typical mixture of fairly open woodland and meadows, and the orchid flora proved satisfyingly rich. All the species we had seen at Cardona were here, generally in greater quantity, with *Ophrys insectifera* particularly plentiful and *O. scolopax* quite frequent. Less conspicuous was *Neotinea maculata*, grouping nicely with *Ophrys lutea* in the scrub. But we also found, in some quantity, the local speciality we were hoping to see - *O. catalaunica*, a member of the *O. bertolonii* group, with a mirror-like patch, very variable in shape, on a dark velvety lip, and sepals generally pinkish. The *bertolonii* group has encountered much splitting in the past few decades, and the variants seem based more on geographical distribution than clear morphological differences: one found in Catalonia should be *catalaunica*. Just to confuse things, I remember being shown 'catalaunica' on the French/Italian border in 1991 and, a week earlier this year, plants across the French border in the Corbières very similar to the ones we had just seen were described to us by German enthusiasts as *O. magniflora*. Ten *bertolonii*-like species are identified in Delforge 1994. There were only two in Sundermann 1975.

If the *bertolonii* group is confusing, that is not so of the most attractive orchid we saw on this Catalonian excursion: large plants of *Orchis simia* on the roadside verge, but

only in small numbers. And *O. simia* can be the cue for a flashback to our earlier encounters with orchids in Catalonia, way back in 1967 and 1968. During seaside holidays on the Costa Brava in late May/early June, we made two excursions into the interior which involved a road through the Pyrenean foothills peaking at about 1000 metres in obviously limestone country between Olot and San Juan de las Abadesas. The roadside here was rich with orchids and, if what we saw in the Cardona region in 2004 was essentially Mediterranean, this was definitely ‘English’ - and flowering at about the same time as in England too. We saw, and photographed with primitive equipment, fine specimens of *Orchis simia*, *O. militaris*, *O. ustulata*, *O. mascula*, *Ophrys apifera* (var *trollii*), *Platanthera chlorantha*, *P. bifolia*, *Neottia nidus-avis* and *Cephalanthera longifolia* - together with another purple *Orchis* species which we have never identified - all in one short stretch of road. It would be nice to revisit the same place at the same season to see if they are still there now.

Finally, our fifth area: **Andalucia** - ‘something completely different’. Our visit there was in the second half of April 1984, with a base in the concrete jungle of the Costa del Sol about half way between Torremolinos and Marbella. This was well placed for visiting the beautiful mountain area just behind the coast, and our ‘guide’ again in planning our outings was the Polunin and Smythies book. This identified two areas, the road between the coast and Ronda, and one further inland around Carratraca and Antequera, as particularly rich in orchids, and both of these did in fact prove fruitful. But the best region we found was nearer to where we were staying, between Mijas and Coin in the Sierra de Mijas quite close to the coast at altitudes of about 300-400 metres. The orchid flora, as might be expected, was resolutely Mediterranean, and the commonest orchids by far were *Ophrys lutea* and *O. speculum*, both of which we recorded in over 20 locations. These were often very large plants growing on roadside verges, and it was the first time we had seen *O. speculum* in Spain - it is a plant I tend to associate more with the eastern Mediterranean.

Also frequent was our old Spanish friend *O. tenthredinifera*, but the greatest interest and novelty for us lay in the *O. fusca* group, which were quite abundant and in considerable variety. The ‘ordinary’ *fusca* was the commonest form, but the very local variety *O. fusca* ssp. *atlantica* (or is it now just *O. atlantica*?) was also present in good numbers and just at the peak of its flowering. This plant is confined to the southernmost parts of Spain and nearby areas of North Africa, and is unmistakable with its large, very dark lip with a blueish pattern at the base. We also saw a version which was pale yellow-green throughout (var.



Ophrys catalaunica
Photo: Simon Andrew

flavescens?) near Ronda.

Other *fusca* varieties quite common in the region were of the ‘*omegaifera*’ type, with the shape of the Greek letter ‘omega’ clearly marked out near the base of the lip. A very pretty variety, just like the picture labelled *O. omegaifera* in P&S (or *O. vasconica* in Delforge 1994) had a vivid chestnut coloration between the ‘omega’ and the lip-base, while others had rather dowdier colours but always a distinct ‘omega’. I think these probably would now be classified as *O. dyris*. Other *Ophrys* we saw included *O. scolopax* and *O. bombyliflora*, but a surprise was the total absence of *sphegodes*-type species, usually so common in Mediterranean areas and Spain generally. Is their place taken here by the *fusca* group? “*Orchis*” species (in the old-fashioned sense) were also well represented in the area, with *O. mascula* the most common, mainly at the higher altitudes. *Anacamptis (Orchis) chapagneuxii* was also quite frequent, often in large groups.

Fine plants of *Anacamptis (Orchis) papilionacea* and *Orchis italica* represented the best of Mediterranean “*Orchis*” species, and *Anacamptis (Orchis) fragrans* was to be found here and there. An oddity, which we saw in several places on the road between Ronda and the sea, was what seemed to be small, pale plants of *Neotinea (Orchis) tridentata*, with almost unmarked lips. I think these were what is now classified as *N. conica*.

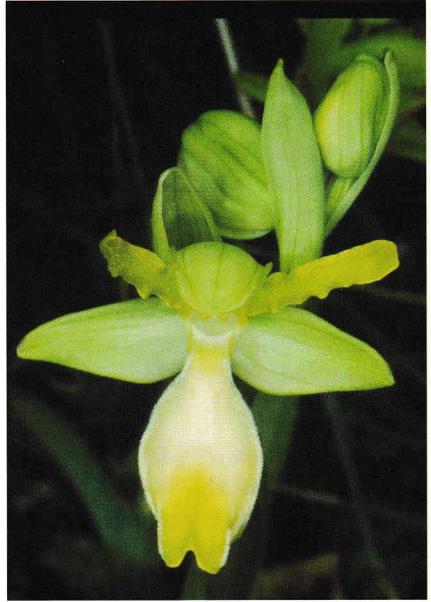
Not the first time we have identified a ‘find’ quite a number of years after seeing it. And finally on “*Orchis*”, a short visit to the lower slopes of the Sierra Nevada on the way to Granada revealed a colony of a greenish variety of *Anacamptis (Orchis) collina*; not very exciting perhaps, but the only place we have seen this very early flowering species in Spain. Other orchids spotted during our Andalusian trip were *Orchis (Aceras) anthropophora*, *Neotinea maculata*, *Cephalanthera longifolia*, *Serapias lingua* and *S. parviflora*, bringing the total number of species seen in flower to twenty.

Not quite up to the standard of our week in the Upper Ebro and Northern Iberian mountains in May/June 1978 (28 species in flower), but a good cross-section of the southern Mediterranean orchid flora. As with the first article, I will conclude with some simple ‘statistics’ which summarise what we came across in our excursions inland from the Costa del Sol in April 1984.

We recorded 22 different sites at which more than one type of orchid was present, and saw 20 different species in flower. They are listed below in order of the frequency with which we saw them, the numbers indicating the number of different sites at which they were present. The dominance of *Ophrys* species is of course typical of a southern Mediterranean area. *Ophrys lutea* 22; *Ophrys speculum* 20; *Orchis mascula* 11; *Ophrys fusca* (normal) 10; *Ophrys tenthredinifera* 8; *Anacamptis (Orchis) morio* (various types) 7; *Ophrys fusca atlantica* 7; *Anacamptis (Orchis) papilionacea* 7; *Orchis (Aceras) anthropophora* 6; *Ophrys fusca (omegaifera type)* 5; *Orchis italica* 5; *Serapias parviflora* 5; *Neotinea maculata* 5; *Anacamptis (Orchis) coriophora fragrans* 4; *Ophrys scolopax* 3; *Neotinea (Orchis) conica* 3; *Serapias lingua* 1;



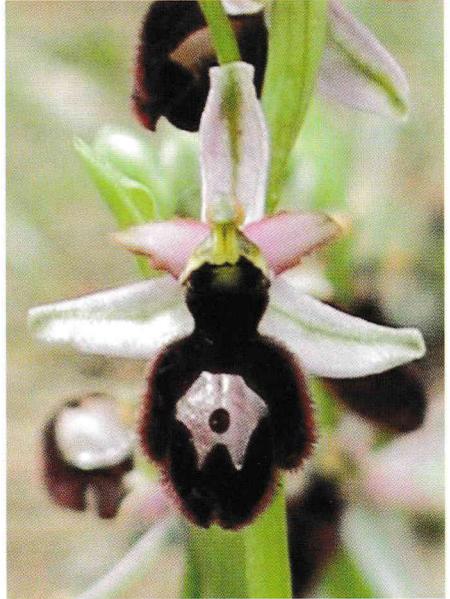
Ophrys atlantica
Photo: Simon Andrew



Ophrys atlantica var *flavescens*
Photo: Simon Andrew



Ophrys magniflora (Corbieres)
Photo: Simon Andrew



Ophrys catalaunica
Photo: Simon Andrew



Orchis conica
Photo: Simon Andrew



'*Ophrys fusca*' *omegaifera* type
Photo: Simon Andrew

Anacamptis (Orchis) collina 1; *Ophrys bombyliflora* 1; *Cephalanthera longifolia* 1.

Thus ends my 'Spanish Miscellany', so-called because, without attempting to be comprehensive, I have covered a wide range of different places and seasons which we have found rewarding and may perhaps be of interest to other 'orchid seekers'.

I think I have mentioned, and shown in the talk, some 45 species seen in flower, and of course there are plenty more to be found. For example we have never been there very early or very late in the season, so we have missed out on the true alpiners and the precocious Mediterranean ones - but we may try those later! Meanwhile, the image of all those magnificent *tenthrediniferas*, to me the quintessentially Spanish orchid from north to south, continues to linger along with many others - particularly perhaps the *speculums* and the wonderful mixed-up *fuscas* in the far south.

Mycorrhizal Specificity and Function in Myco-heterotrophic plants Bill Temple

This article is a précis of part of a chapter in *Ecological Studies*, Vol. 157, entitled *Mycorrhizal Ecology* by D.L. Taylor, T.D. Burns, J.R. Leake & D.J. Read.

I would like to thank Lee Taylor for kindly giving permission for it to be included in

the Newsletter, and for checking what I have written.

Glossary

Achlorophyllous – having no chlorophyll.

Anastomosis – the fusing together of fungal hyphae.

Angiosperm – a plant producing flowers and seeds.

Autotrophic plant – a plant able to fix its own carbon

Chlorophyll – a green plant pigment involved in photosynthesis.

Ecto-mycorrhiza (EM) – an association of fungi and (usually tree) roots characterised by a sheaf of hyphae on the surface of the root tip. The hyphae penetrating into the roots are involved in carbon transfer.

Heterotrophic plant – plant that is unable to fix its own carbon.

Myco-heterotrophic plant (MHP) – plant that receives carbon compounds from a fungus.

Mycorrhiza – a symbiotic association of fungus and plant.

Précis

Dependence on fungal derived energy sources has arisen independently on multiple occasions during the evolution of land-based plants. There are approximately 400 fully myco-heterotrophic angiosperms, in many different taxa, known at this time; more than one third of these are orchids. MHPs can be divided into groups – those that have totally lost their ability to fix carbon, and those, which at least in later stages of the life cycle, have some autotrophic capability, and can therefore be regarded as partially MHP. Fully MHP plants represent one end of an evolutionary continuum in which plants at the other end show no dependence upon fungi for a supply of carbon.

Most orchids produce large numbers of dust like seeds, lacking substantial energy reserves, and typically highly adapted for wind dispersal. The lack of substantial energy reserves in the seed is the reason that orchids and other MHPs in nature form mycorrhizal associations in order to grow. While most orchids eventually produce green leaves to carry out photosynthesis, fully myco-heterotrophic orchids rely on fungi for their nutritional requirements. The fungal hyphae form coils and are found in certain cortical cells, these coils are called pelotons.

The authors have found that a number of the orchids that contain green pigment (chlorophyll) associate with a wide range of fungi, and hence have little specificity. They have also found that some other species of orchids that contain green pigment, and all achlorophyllous orchids, associate with one, or only a few species of fungi. In several species of orchid this high specificity has been shown to apply from seed germination to adulthood in nature. Some achlorophyllous orchids associate with wood-decay or parasitic fungi. Workers in Australia have found that some species of orchid are restricted to associations with a single fungal species.

Most species of plants however display little specificity. When seed is germinated in vitro, the high specificity found in nature may not apply. In addition to the normal

mycorrhizal relationships, radioactive tracer studies have shown that autotrophic ectomycorrhizal (EM) host plants can provide carbon to nourish MHPs that are linked by a shared fungus. Many of the known fully MHPs are known to have EM relationships. Partial MHPs are even more widespread and many orchids with green pigments fit into this category.

Just as apple varieties can be grouped according to their ability to pollinate each other, fungi can be grouped according to their ability to fuse hyphae (anastomose) with each other. Masuhara et al (1993 & 4) showed that in vitro germination and growth of partial MHP *Spiranthes sinensis* was stimulated by strains of 23 multinucleate or binucleate anastomosis groups of fungi. In the field however seeds planted out were colonised by a single species of fungi in 26 out of 27 cases (*Rhizoctonia repens*), even though 7 different *Rhizoctonia* anastomosis groups were present. Isolates from these groups (obtained from the sites) were shown to be able to simulate germination and growth in vitro even though they were not associated with plants in the field. Patterns of specificity have been correlated with the distribution patterns of fungi and habitat variation in a number of MHPs. It was found that different orchid species growing in the same location often harboured the same *Rhizoctonia* strains, while a single orchid often harboured different *Rhizoctonia* strains in each distinct habitat in which it was found. In a number of tests using fungi isolated from one species of adult orchid it was often found that the fungi were ineffective at germinating the seed of that species, but would stimulate germination in the seed of other species of orchid.

Other plant studies have shown that the outcomes of particular plant-fungus interactions in vitro are highly dependent on the exact nutrient conditions of the media, and that fungal isolates lose their symbiotic potential over time when maintained in culture. These factors may have contributed to inconsistencies in laboratory germination studies.

Molecular phylogenetics and Ultrastructural methods are helping to resolve the problems of identification and taxonomy of fungi, and of discriminating between mycorrhizal and non-mycorrhizal isolates.

While the above clearly answers a number of questions about orchids, and explains some of the problems experienced by amateurs, when raising orchids from seed. It also implies that protection of the exact sites where both the orchids and the fungi occur is needed, and possibly explains the problems that can be found in relocating some species of orchid. Finally it has also suggested many more questions that we did not realise that we needed to ask.

Pale Ladies

Mike Gasson

I recently joined the Hardy Orchid Society having rekindled a somewhat latent inter



Fig 1: *Orchis purpurea* - albino, green hood. Photo: Mike Gasson

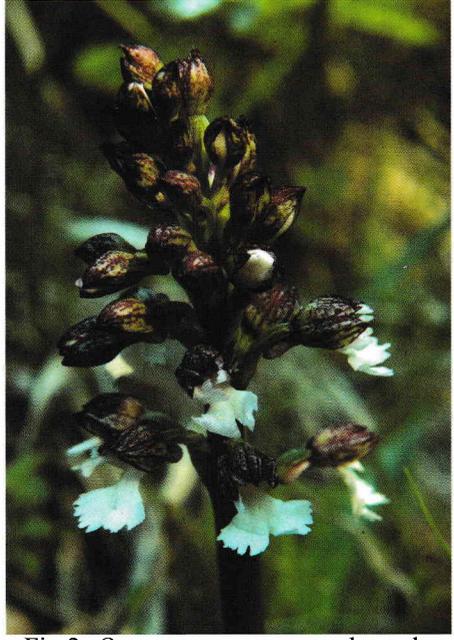


Fig 2: *O. purpurea* - green and purple hood. Photo: Mike Gasson

est in wild orchids that began back in the late 1970's. As a fan of the true *Orchis* species, one of my more memorable early orchid trips was to Yocklett's Bank nature reserve in Kent where at the time there was a quite spectacular display of Lady Orchids. The highlight was finding an albino specimen with an unmarked lip and pure green hood (Figure 1). This plant was reasonably isolated but growing alongside one other plant of similar form with an unmarked lip but possessing a distinctive mottled green and purple hood (Figure 2). This plant was quite unlike the many varied but typically coloured plants that were present and, perhaps rather fancifully, I like to think of it as an intermediate form: something of a half way house between the albino and fully coloured plants. These two Lady Orchids were present when I visited Yocklett's Bank in 1980 and 1982, although strangely they were both absent in 1981.

This year, having acquired the HOS back catalogue of Journals and Newsletters, I was intrigued to see a report of the Society's 1996 field trip to Kent which mentions an albino Lady Orchid at Yocklett's Bank, described as having 'about 30 green and white flowers' (Tarrant, 1996). My reason for highlighting green hooded Ladies relates to the seminal study of Kentish *Orchis purpurea* which describes albinos as having 'pure white lips and straw coloured hoods' (Rose, 1949). The 'straw coloured' description is repeated by Summerhays (1951) and Lang (1980) but to my eye the Yocklett's Bank albinos had distinctly green hoods. This is also true for the albino *Orchis purpurea* in the 'Illustrations' book by Turner Ettlinger (1998). The latter author's 'Notes' compan-

ion (Turner Ettlinger, 1997) also describes the albino Lady Orchid as lacking anthocyanin with a pure white lip and white hood veined with green. Turner Ettlinger gives the scientific identity of the albino as var. *albida* Camus (syn f. *albiflora* Rosbach). Also the HOS website features a Kent albino Lady Orchid of this same type, photographed by Tony Hughes.

Having pondered over the subtlety of hood colour since 1980, I was delighted to find straw hooded Lady Orchids during a short orchid trip to France taken in early May last year. The visit was prompted by reading the excellent HOS articles by Richard Manuel and Tony Hughes. We stayed initially in the area around Richardiere but in truth were a little too early for the best of the orchid flora, although *Ophrys araneola* and *Orchis pallens* were easy enough to find. As a result of being a little premature we strayed eastwards and enjoyed a typically French display of roadside orchid species with many beautiful pure Ladies. These included a small colony with three distinctly straw hooded albinos (Figure 3). The other plants in this colony were strongly coloured with typical anthocyanin containing purple hoods and marked lips making the albino forms a very obvious colour break. The straw versus green distinction is reinforced by the inclusion of a clearly straw hooded Lady amongst the illustrations in the SFO atlas of Haut-Normandie (Demares, 1997). The question in all of this is whether what seem like distinct albino forms are genetically different or simply an example of environmentally induced variation. It is likely that over time independent mutations that interrupt the biosynthesis of anthocyanin pigments occur in the Lady Orchid. In this case it might not be surprising for distinct mutations or genetic backgrounds to cause subtle differences in the appearance of albino plants. In any event does seem that Lady Orchid albinos can found with green or straw coloured hoods. My French trip had other highlights including *Anacamptis (Orchis) coriophora* and the quite beautiful hybrid between *Orchis (Aceras) anthropophorum* and *Orchis simia*. I am hoping to return next year to pursue a rejuvenated interest in the wonderfully varied *Orchis* species and their hybrids.



Fig 3: *Orchis purpurea* - straw hooded albino. Photo: Mike Gasson

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Rediscovery of *Epipactis cambrensis* at Kenfig NNR

L. Lewis and E. J. Spencer

It is easy to contemplate that an orchid growing deep in the rainforests of Amazonia or Papua New Guinea might not re-found for more than 50 years after the publication of its discovery. In Britain, however, particularly in a densely populated area of S. Wales only a mile or so from where the M4 now runs, it might seem rather far-fetched. The orchid concerned is the “Kenfig *Epipactis*”, *Epipactis cambrensis*, the re-discovery of which has been published in a Note in the February 2005 issue of *Watsonia*.

E. cambrensis was discovered in July 1941 at Kenfig Burrows (now Kenfig NNR) by Charles Thomas, a Birmingham botanist who the previous year had published the discovery of *E. pendula*, now *E. phyllanthos* var. *pendula*. However, he did not publish his discovery of *E. cambrensis* until 1950, with a further paper, also in *Watsonia*. In that paper, he described how, while examining *E. palustris* var. *ochroleuca*, he chanced upon two strange plants growing on the steep side of a sand heap in a thick tangle of the Creeping Willow, *Salix repens*. The plants were small, delicate, yellowish-green in colour with yellowish white flowers. Further searches revealed more specimens growing in similar situations at both Kenfig and the adjacent Margam Burrows.

Although the plant was renamed by P. T. Sell and J. G. Murrell (1996) in *The Flora of Great Britain and Ireland*, Vol. 5 as *E. phyllanthos* var. *cambrensis*, its existence as a distinct taxon has not been generally accepted. *E. cambrensis* is normally listed in reference works only as a synonym under *E. phyllanthos*. Indeed, only two years after the publication of its discovery, D. P. Young (after whom *E. youngiana* is named) commented, in a study of *E. phyllanthos*, that on several visits to Kenfig he had not been able to find plants corresponding exactly to Charles Thomas’s description and “that more evidence that *E. cambrensis* was distinct from *E. phyllanthos*, and not just a dwarfed state of it,



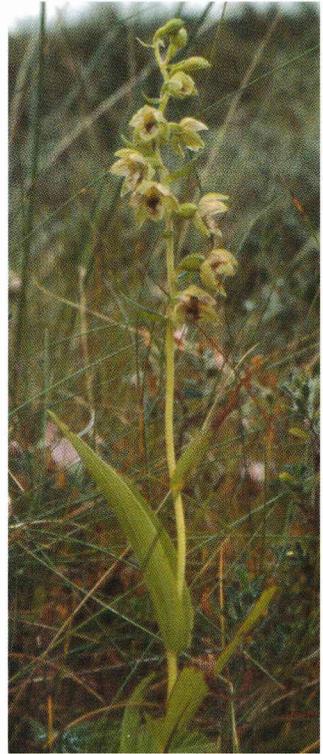
Epipactis helleborine aff
neerlandica

Photo: Les Lewis

would be welcome”.

Much later, D. M. Turner Ettliger (1997) reported that no-one had been able to re-find or identify *E. cambrensis* with certainty, and this was still the position up until 2004. Some visitors to Kenfig NNR may be surprised by this statement. However, it seems highly probable that most, if not all, of the sightings since 1950 relate to one

or both of two other unusual forms of *Epipactis* which grow at Kenfig NNR (described in HOS Newsletter No. 28, April 2003). One form, with darkish green leaves, resembles the continental *E. neerlandica* and is listed under that name by P. Delforge (2001) and D. M. Turner Ettliger (1997, 1998). However, since the precise identity of these plants has not been established, the new name *E. helleborine* aff. *neerlandica* is suggested in our Watsonia Note, pending further study. This follows correspondence with the BSBI Referee on *Epipactis*, Prof. A.J. Richards. The other form, which has an overall yellowish-green colour, resembles the controversial *E. youngiana* and is referred to under that name by P. Delforge (2001), D. M. Turner Ettliger (1997, 1998) and D. Lang (2004). The new name *E. helleborine* aff. *youngiana* is suggested in our Watsonia Note.



Epipactis helleborine aff. *youngiana* Photo: Les Lewis

The confusion has arisen because some of the more lax aff. *neerlandica* and aff. *youngiana* plants, at least in bud, bear some resemblance to *E. phyllanthes*. This led D. M. Turner Ettliger (1997) to speculate that the yellowish-green aff. *youngiana* might be *E. cambrensis*. However, both aff. *youngiana* and aff. *neerlandica* have pink (not yellowish-white) flowers, and flowering plants have leaves and inflorescences which are quite different from C. Thomas’s description of *E. cambrensis*. In addition, aff. *youngiana* and aff. *neerlandica* grow in and around the open dunes whereas, as reported by C. Thomas, *E. cambrensis* grows on the steep slopes of sand heaps. In the absence of any confirmed re-finding of *E. cambrensis* corresponding to C. Thomas’s description, it is assumed that most, if not all, of the reported finds of *E. cambrensis* since Charles Thomas’s discovery related to aff. *youngiana* and aff. *neerlandica*.

However, during the 1990s a small number of unusual *Epipactis* plants, with whitish flowers, were found in the dunes at Kenfig NNR by Steven Moon, while he was Warden there (personal communication, 2004). A photograph of one such plant, which he described as exceptionally robust, is included under the name *E. phyllanthes* var. *pendula* in a poster of Kenfig orchids on show at the Reserve Visitor Centre.



Epipactis cambrensis

Photo: E.J. Spencer



Epipactis helleborine aff

neerlandica Photo: E.J. Spencer

It is possible that this sturdy plant was of hybrid origin, for it is not representative of the small delicate *E. cambrensis*. In late July 2004 we searched the area of dunes where he had discovered these plants and found a single small, lax yellowish-green *Epipactis*. It was in bud, but with one whitish flower beginning to emerge, and was growing on the north face of a steep sand heap. When the site was revisited in early August, the plant was fully in flower. Three similar plants were found in a similar location on another sand heap close by. The plants were yellowish green, up to 23cm high, and with four to six flowers. The lips were a yellow-greenish white, with some epichiles reflexed, but others not. Both sepals and petals were long and curly, very different from, say, *E. dunensis*. The leaves were narrow and sharply folded upwards on the midrib.

Photographs and details of these four plants were submitted to Professor Richards. After comparison with C. Thomas's description and with herbarium specimens, he confirmed that, in his view, the plants were indeed the same as Charles Thomas's *E. cambrensis* (personal communication, 2004). He also confirmed that the plants were a form of *E. phyllanthes*. In addition, he observed that the leaves were extremely narrow for a Western European *Epipactis*, thus giving the plants a distinctly unusual appearance (C Thomas had similarly commented that *E. Cambrensis* differed from any *Epipactis* that he had previously encountered and that its leaves appeared very slender because they were folded sharply upwards from the mid-rib). In view of its noticeably different appearance from other forms of *E. phyllanthes* in particular its

narrow oblong lanceolate leaves, sharply folded about mid-rib, it is suggested in our *Watsonia* note that, although the plants can not be considered a distinct species, as suggested by Charles Thomas, they would appear to warrant the status of a variety: *E. phyllanthes* var *cambrensis*.

Acknowledgements

We would like to thank Prof. A. J. Richards for his extensive advice on the identification of the plants we found and on the dune forms of *Epipactis* which had previously been found at Kenfig, and Steven Moon, a former Warden at Kenfig NNR, for information on his earlier finds at Kenfig.

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The Early Marsh-orchid (*Dactylorhiza incarnata*) in northern Europe

John Hagger

V – Red flowers and dune forms

Early Marsh-orchids with truly red and not reddish purple or pink flowers are most commonly found in Britain and Ireland in populations growing in the wet slacks of calcareous coastal sand dunes. Various authors have described these plants over the last century as var. *dunensis*, forma *atrirubra* or as subsp. *coccinea*.

Before commencing a review of these plants, it is worth noting that individuals with bright rose-red flowers are not confined to these dune habitats, either in the British Isles or on the Continent (where the dune-specialised diploid marsh-orchids almost exclusively have flowers of a pink colour similar to western European subsp. *incarnata*). Early Marsh-orchids with truly red flowers have been described from Swedish

fens, for example, and they are not infrequently encountered in some of the fen populations of central England, north Wales and eastern and central Ireland and in marshy hill pastures in the north. In Ireland, such plants have been described as subsp. *coccinea* (Feehan & O' Donovan 1996) but in other stations (e.g. Wicken Fen) the plants are assumed to be red-flowered individuals of subsp. *incarnata*. A distinction appears to be particularly difficult to make in places like Anglesey, where some fen margins harbour diminutive plants of *Dactylorhiza incarnata*, only some of which bear red flowers. Much of the European literature describes subsp. *incarnata* as having potentially red or rose-red (i.e. red with a hint of purple) flowers and Danesch (1962) illustrates plants from the Alps with flowers as deeply coloured red as many British dune plants.

The anthocyanin patterns in specimens of red-flowered dune *incarnata* from Ireland were analysed in 1989, along with those from Austrian specimens of *D. incarnata* subsp. *incarnata* (presumably plants with pink flowers) and with those of Irish specimens of *D. incarnata* subsp. *pulchella* (the ecotype was not mentioned but the flowers must have been purple according to Heslop-Harrison's 1956 definition of the subspecies) (Strack et al. 1989). The pattern identified in the red flowers was exceptional in that it differed markedly from the patterns found in the other two Early Marsh-orchid subtypes studied. High levels of the pigments chrysanthemine and ophrysanin in the red flowers replaced the cyanin and orchcyanin I and II that formed the bulk of the pigment in the other two colour forms. The authors used this unique (in their study) pigment signature, coupled with the morphological characteristics of subsp. *coccinea*, to support the elevation of *coccinea* to a new species. Unfortunately, no other *incarnata* subtypes with red flowers were investigated in their study; it seems quite possible that the red colour of the dune forms is no more than an intensification of the pigment pattern found in red specimens of subsp. *incarnata* and may be due to only slight genetic differences. The authors suggested that *D. incarnata* subsp. *coccinea* differed markedly in form from *D. incarnata* (subsp. *incarnata*) and its subspecies, but as the following paragraphs will show this is not necessarily the case.

The dune plants of Britain and Ireland frequently display flowers of an exceptionally dark ruby red and many authors have characterized them by it. Many dune populations, however, show great variability of floral pigmentation, resulting in a mix of flower colours that ranges from almost pure white through various shades of pink and red to ruby. It is interesting that the colour forms in these florally polychromic populations of dune *incarnata* frequently display a continuum of shades, which lends support to the opinion that they constitute a single variety. Discrete flower colour dimorphism (i.e. pink-purple) or polymorphism (i.e. pink-purple-red-ivory), such as may be found uncommonly in fen populations (e.g. Wicken Fen), has been used as one of the criteria to classify some of the various forms as different subspecies (Heslop-Harrison 1956. Bateman & Denholm 1985). In contrast, similar fixed flower colour dimorphism in the *Dactylorhiza sambucina* group appears not to warrant varietal or subspecific splitting. Perhaps it should not in *D. incarnata* either.

Druce (1916) published the first description of a distinctive sand dune form of *D. incarnata*. The plant he described as small with a loose spike and bright rose red flowers is undoubtedly synonymous with the orchid we know as subsp. *coccinea* today. Named *Orchis incarnata* var. *dunensis*, Druce re-described the plant in 1918 as “a small beautiful plant found on sand dunes in a large series of bright colours from pure white, various shades of rose, red and crimson to darkest purple.” Although including plants from Lancashire and Devon, this diagnosis was based primarily on Early Marsh-orchids from Barry Sands, Forfar, eastern Scotland, where multi-coloured plants can still be found today. It might be that Druce’s revised description included dune forms of the hitherto undescribed *Dactylorhiza purpurella*, which most likely accounts for the inclusion of a subpopulation with dark purple flowers. The *purpurella* that occur in the dune systems of southeastern Scotland characteristically bear flowers with *incarnata*-like recurved deltoid labella (R. Bateman, personal communication, 2004) One seemingly inviolate characteristic of Early Marsh-orchids found growing in calcareous sand dunes in Britain and Ireland is the lack of dark purple flowers, though they do rarely occur in the continental dune forms (Kreutz & Dekker 2000).

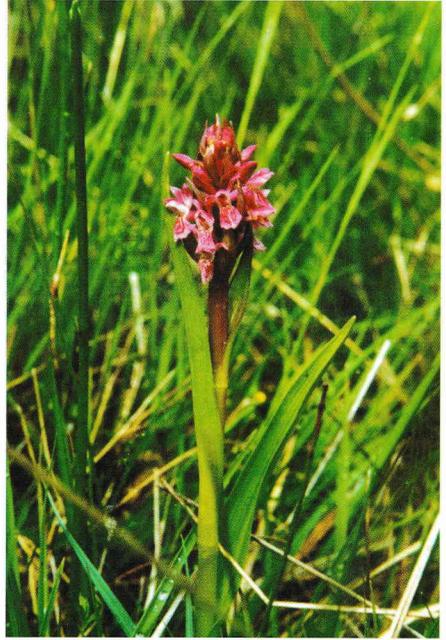
Some 15 years later, a famous monograph by Godfery (1933) described both Druce’s florally polychromic var. *dunensis* from Barry Sands and a new forma *atrirubra* from the dune systems of southern Wales. Unlike the small var. *dunensis*, the new form was described as only “**usually** dwarf with thick tapering leaves and flowers of a rich dark rose red.” There can be little doubt that the new form was synonymous with red flowered specimens included by Druce in his var. *dunensis*. Godfery’s justification in naming a new form seems to rely entirely on the facts that his plants **all** had red flowers, and that some were tall with narrower leaves. His accompanying illustration would immediately be recognized today as a specimen of subsp. *coccinea*.

Already in the 1930s, it was evident that British dune forms of *D. incarnata*, although **usually** dwarf and **usually** red flowered, were actually polymorphic to quite a marked degree in terms of flower colour and to a lesser extent with respect to vegetative anatomy. It has been widely assumed in the past that aberrant plants or subpopulations in our dune systems with atypical morphology or flower colour result from introgression by other “subspecies” of *D. incarnata*, especially by the so-called nominate race, subsp. *incarnata*, which most often bears pale pink flowers. In many cases, however, there are no colonies of other subspecies for tens of kilometres distant to the dune populations in question. Surely, the atypical plants are more likely to be a genetically integral part of the dune population and would be much more appropriately described as belonging to the same variety or subspecies as the other plants with which they grow. It has been suggested that these aberrant forms might persist by adopting an autogamous means of reproduction (R. Bateman, personal communication), but even if this is the case, it seems more likely than not that they have arisen from their companion dune plants and retain a close relationship to them.

Heslop-Harrison (1956) described one population from Co. Galway in western Ireland as being intermediate between subsp. *coccinea* and subsp. *incarnata* as a result of the evident flower-colour polymorphism there. The author placed a great deal of weight on the significance of environmental factors in separating the various subspecies of the Early Marsh-orchid, and opined that the particular habitat of adjacent dune system and dune marsh at this site might be responsible for the variability in form and flower colour. The implicit suggestion, of course, was that the fen form, subsp. *incarnata*, had hybridised with the dune form, subsp. *coccinea*, to produce the observed variability. The veracity of this theory is difficult to accept in this part of western Ireland, however, where pink-flowered *D. incarnata* is a decidedly rare entity and where most plants in the limestone fens actually have dark purple flowers (Webb & Scannell 1983).

It has become traditional in modern times to describe individual dune plants or sub-populations with pink flowers as subsp. *incarnata*, whether or not they share the typical diminutive size and form of specimens of subsp. *coccinea* (Turner Ettliger 1997, 1998). In many sites, though, a range of flower colours from deep red to pale pink and even off-white may be found in orchids of an otherwise similar dwarf form. In some places in the dune systems of northern Wales there are apparent differences in soil properties on the periphery of the colonies where paler flowers are discovered, and here it might be that drier ground or sand with a different pH or mineral content is responsible for some of the variability in the flower colour. It has already been mentioned in an earlier article in this series that the density of red pigmentation in the flowers of some populations of the Early Marsh-orchid seems to be affected by environmental factors. It is unlikely, however, that flower-colour variation in British dune forms of *D. incarnata* is entirely an epigenetic phenomenon. The tremendous variation in flower colour in Druce's original var. *dumensis* population from Barry Sands in Scotland, for example, points more to genetic variation than to the consequences of small differences in the rhizosphere of adjacent plants. Flower colour variability is likely to be due to very minor genetic difference so it is hardly surprising that no genetic variation has been identified in this context. In addition, the forms of *D. incarnata* found in the dune slacks of nearby coastal continental Europe usually have pink flowers (they have been described as being dilute/light reddish lilac to purple) despite the fact that they share a very similar morphology and environment with their British and Irish cousins (Landwehr 1977. Kreutz & Dekker 2000. Pedersen 2001). Moreover, when the seed of subsp. *coccinea* is artificially propagated it breeds true to form and gives rise to red flowered plants when grown on most composts, although some year to year variation in the density of the flower colour has been observed when the orchids are repotted onto substrates of variable composition.

The red-flowered plants with unusually tall stature and narrower leaves that Godfrey included in his forma *atrirubra* may be found growing in the lush meadows that form on the inland part of stabilized sand dunes. On occasions, plants of atypical morphology can also be found in the very wettest parts of the dune slacks where the habitat borders or becomes marshland. It has been suggested that this plasticity in form



The top two and bottom left photos are florally polychromic specimens of *D. incarnata* ssp *coccinea* from Newborough in Anglesey. The bottom right photo is a *D. incarnata* ssp *incarnata* with red flowers from an Anglesey fen. Photos:John Haggart

might be due entirely to environmental factors such as poor grazing, enhanced soil moisture or increased soil depth, but genetic variability seems also to be a factor. When artificially propagated and cultivated, the seed of dwarf, red-flowered plants always appears to grow into dwarf, red-flowered progeny however damp the compost or sheltered the environment may be. It is, in fact, very difficult to persuade such plants to grow on anything other than very well-drained composts. Under such conditions, more moisture retentive soils seem to promote death rather than robust form! In those sites where I have encountered atypical forms, the morphology of the flower (a character in which similarity is usually a good indicator of genetic proximity in dactylorchids) appears to be virtually identical to that of the companion dwarf plants, suggesting a very close relationship rather than hybridization with a less closely related form. The polymorphism might well reflect some as yet unidentified genetic variability that is present at only a low level with a few rare genes in some individuals favouring conditions that might be less than optimal for the population as a whole. Traditionalists might explain the presence of such uncommon genes by blaming introgression, but it is an equally valid interpretation to consider it as relict, from a time when the ancestral population might have been more polymorphic than it is today and might have harboured a greater amount of genetic variation than it does now. What is certain is that many dune populations contain some plants that appear to be intermediate between the usually accepted norms of the dune form and subsp. *incarnata*, and it is widely believed by many experts that the dune populations of Britain and north-west Europe are closely related to the generally more robust pink flowered forms of subsp. *incarnata* found in basic fens and wet meadows inland (Pedersen 2001). Flower-colour polymorphism is one expression of intermediacy in the British Isles, but on the Continent the distinction is more difficult to make because of the similar range of flower colour for the two forms. My contention is that the intermediates are as likely to be indicative of an imperfect separation of the two evolving forms as of recent introgression.

In 1936, for reasons that might appear dubious today, Pugsley dismissed Druce's original description of var. *dumensis* as "a state due to environment" and decided to rename Godfery's forma *atrirubra* and raise it to the state of a new variety, var. *coccinea*. At a stroke, dune plants that were white or pink flowered or substantially different in form from the majority were excluded from the taxon, although informed observation would surely suggest that such aberrant individuals are likely to be part of the same gene pool. Pugsley's var. *coccinea* was adopted by Summerhayes (1951) in his "Wild Orchids of Britain" and was raised to the rank of subsp. *coccinea* by Heslop-Harrison (1956), in my opinion unjustifiably. Similar treatment by later authors perpetuates Heslop-Harrison's unproven notion that polymorphism in British *Dactylorhiza incarnata* results from the mutual introgression of supposedly genetically and morphologically distinct subspecies (differentiated in reality on the basis of little more than flower-colour alone) and allows no room for the idea that the polymorphic state might actually be more primitive, perhaps even ancestral to the bulk of the forms and varieties found in the species today (Heslop Harrison 1953). Characters other than flower

colour that have been shown to partially differentiate the various subspecies may have arisen in concert with it via descent from an ancestral polymorphic state (Heslop-Harrison 1956. Bateman & Denholm 1985). There is no evidence to date that proves conclusively that either theory is correct.

The dune forms of nearby Continental Europe constitute what are probably the most common extant forms of *Dactylorhiza incarnata* in the Netherlands today, and they range northward to Denmark and the southwest coast of Norway. Found in dune slacks on the extensive coastal sand-dune systems bordering the North Sea, the form and stature of these plants are exceptionally close to those of the British and Irish dune forms. Historically referred to in the Continental literature as var. *dunensis* or var. *lobelii*, these usually dwarf taxa with almost invariably pale red or pale lilac flowers have recently been the objects of biostatistical study (Pedersen 2001). Together these variants appear to encompass the entire range of morphology (excluding flower colour) described by Godfrey with respect to his South Wales populations. The study (which claimed that flower colour seems to be a reliable defining character in the British dune forms) concluded that no characters could be found to distinguish reliably between selected dune populations from Denmark and the Netherlands and that these Continental forms should be united as subsp. *lobelii*, to the exclusion of the British dune forms, assigned to subsp. *coccinea*. Three populations from Britain, all containing diminutive plants with flowers coloured lighter or deeper red from the North Wales dunes were included in Pedersen's study. It seems, however, that only three characters enabled reliable distinction between the Continental forms and these Welsh plants. All were characters of pigmentation: presence or absence of stem anthocyanin below the rachis, colour of the flower, and brightness of the flower. Such pigmentation characters, as discussed earlier, are highly likely to be oligogenic (i.e. under the influence of only a few genes) and are inconsistently present even within the British and Irish forms themselves. Thus they are likely to be of little taxonomic value. Based on the descriptive keys published one would not be hard pressed to find specimens thoroughly consistent with the exclusively continental *D. incarnata* subsp. *lobelii* in parts of Wales and Scotland! There is even a dubious report of subsp. *coccinea* from the coast of Jutland in Denmark, suggesting that even here the flower colour of the dune forms is less than stable (Johnsen 1997). We might ask at this point what we actually mean by subsp. *coccinea*, if not just a dune form with a pigmented stem and red flowers?

It has been said that the European dune forms (*sensu lato*) are late flowering when compared with populations of the species found growing in inland fens (Pedersen 2001). Unfortunately, the plants grow across quite a wide range of latitude and adjacent to seas that are highly variable in temperature, making such assessments difficult. Bateman and Denholm (1985) advised that flowering time was useless as a taxonomic diagnostic tool in the British forms of *D. incarnata*. The flowering time of the British dune forms is highly variable with a latitudinal bias and a protracted period in the far north. Plants growing next to the comparatively warm Irish Sea may flower two

or three weeks earlier than plants on the Norfolk coast on a similar latitude but adjacent to the colder North Sea. Given similar conditions of cultivation in inland southern England, however, red-flowered plants grown from Welsh seed flower some three weeks later than pink flowered fen plants grown from locally collected seed. The dune forms appear to be united in their character of late flowering based on these limited observations. It has been mooted that in those places where dune forms and true fen *incarnata* (i.e. “pure” subsp. *coccinea* or subsp. *lobelii* and “pure” subsp. *incarnata*, whatever they might be) really do grow together, differences in chosen microhabitat and in peak flowering time are evident (Pedersen 2001). Wherever I have personally encountered polymorphic forms in the British sand dunes, however, they all appear to be flowering simultaneously and I doubt the validity of both the above point and the purity of the so-called subspecies in such situations! Perhaps the Continental forms behave differently.

Prehistoric evidence would suggest that the dune forms of *D. incarnata* have evolved recently. As little as 12,000 years ago there were no coastal dune systems anywhere within the forms’ current geographical distribution. The Irish and North seas were dry land. The English Channel extended no further east than the Isle of Wight up to 10,000 years ago and a major tributary of the Rhine flowed into the North Atlantic Ocean across a land bridge linking Denmark to northern England. The coasts that were destined to shrink back to become those of eastern Britain and the Low Countries were at this time continuous save for the Rhine breach. Assuming that *D. incarnata* had already re-entered post-glacial northern Europe by this time, and that the dune forms had already begun to evolve their widely recognized habitat preferences, they would have shared a much more contiguous distribution across any dune systems along Europe’s north coast. Of course, all these ancient sites are now submerged, but the southern part of the North Sea did not form until less than 9,000 years B.P. and the Haisborough to Terscheeling Rise that linked East Anglia to the Netherlands was not finally breached until about 8,000 years B.P. (Preece & Bridgeland 1998). Gene flow between the coastal *incarnata* of eastern England and the Netherlands could have continued up to this time. This supposition is supported by the presence in northeast England and southeast Scotland of dune populations that appear to harbour large proportions of plants with flowers that are pink and not red, and that thus appear to be partly intermediate between subsp. *coccinea* and subsp. *lobelii* (Druce 1918. Turner Ettliger 1997, 1998).

These observations would support a common inheritance for the dune forms of the British Isles and the European mainland rather than independent origins as suggested by Pedersen in 2001. A shared origin with an ancient adaptation to dune slack habitats would make the separation into different subspecies unwarranted without further supporting evidence. No genetic differences have been demonstrated experimentally between any of the British and Irish forms of *D. incarnata* (except a single difference in a proportion of the *cruenta* forms and identified by Bateman, Hedrén and colleagues) and it is questionable whether the dune forms of the continental North Sea coasts would be different in this respect. This genetic marker, differentiating some

cruenta forms from the other British varieties, appears to be present in all (tested) Continental and Scandinavian *D. incarnata* specimens (R. Bateman, personal communication, 2004) but I am uncertain whether or not it occurs in subsp. *lobelii*. Its presence or absence, however, does not necessarily confirm independent origins and I shall present an alternative explanation of this fascinating finding in a later article.

In my opinion, all the dune populations of *D. incarnata* in Britain, Ireland and north-west Continental Europe should be assigned to var. *dunensis*, Druce's (1916) original description. Such a treatment would be better at recognizing and accepting the inescapable polymorphism and floral polychromism than the current classification of exclusive and probably false subspecies. Epithets such as forma *leucantha*, forma *atrirubra* or forma *ochrantha* can always be used by those who wish to deepen the significance of flower colour in their descriptions.

A major question that remains over the dune forms of *Dactylorhiza incarnata* is the reason for the adoption of the unusually deep red colouration of the flowers in such a high proportion of the British and Irish plants while their continental cousins remain basically the same pink colour as the fen forms from which they almost certainly descended. The evolutionary pressures that might have caused this change, probably over no more than six or seven millennia, I hope to discuss in a later article in the series. A full list of references and additional illustrations will shortly be available on the author's web site at www.johnsorchids.co.uk.

ORCHIDS OUTSIDE

Richard Manuel

When I moved to my present house in south Herefordshire, in May 1999, my immediate priority, ahead of such trivia as making the house habitable, preventing the roof leaking, installing a kitchen sink, decorating, etc, was to build a new greenhouse before the autumn, when all my dormant tubers would burst into growth. The site chosen was a gentle slope down towards the house, but some hard landscaping was necessary. We had three jolly builders working for us at the time, doing essential and noisy things to the house; so I got them to dig out a pit with their JCB in which to provide a stable and level base for a 25 x 10ft greenhouse. As it was a very wet Summer this soon made a nice but shallow swimming pool in the clay subsoil, and it wasn't until after they had laid drainage pipes and the base/block work that I was able to go ahead and build the rest myself. The greenhouse was finished in time, and with the plants potted and in growth, I turned my attention to the bank behind the greenhouse. This had been fairly neatly graded to about 30 degrees and what passed for topsoil in the area (which had been piled up elsewhere) was spread over the surface. In November I sowed a mixture of meadow grass and wildflower seed, which germinated remarkably quickly and soon the bank was green. The following Summer I was rewarded with a fine display of limestone grassland flowers, such as centaury, horse-shoe vetch, oxeye daisies, mallow, and yellow rattle. The latter was augmented by extra seed in coming years, and is now well established and controlling the more vig-

orous grasses.

For the next couple of years I did little to the bank apart from cutting it laboriously by hand, trying to produce the appearance of a well grazed pasture. Then, by way of experiment, I started introducing a few orchids, in 2001. The first were several flowering sized Common Spotted (*Dactylorhiza fuchsii*) and Green Winged Orchids (*Anacamptis [Orchis] morio*). The former only survived one growing season, flowering well, but only one survived till the following year, probably because we had a very dry summer and I didn't plant them out until April, which may have been too late for them to get properly established. But the *morio* did well, a couple flowering in 2002, all of them in 2003 and this year, and as I write in Sept 2004, they are again making nice new leaf rosettes. They seem to be well established and a few seedlings have even appeared. Further along the bank I started, from 2001 and subsequent years, to put in the odd *Ophrys* tuber, principally a few that escaped during repotting and turned up, unlabelled, on the bench later on. These were all small or medium seedlings. In the winter of 2002/3 one of these turned up with a good sized rosette, so I marked it and later in 2003, when it started its new growth, I dug it up and moved it to a more favourable position. In the same 'special' patch, which I kept clipped short, I put a number of two year old bee orchids. These were joined a little later by a couple more errant tubers, which I thought were also bee orchids (but they weren't!). This patch was looking good, so I enhanced it with my four remaining Pyramidals (*An. pyramidalis*).

This year, 2004, the large unknown *Ophrys* started to produce a flower spike in February!, as did the two others that I had thought were Bees. This trio survived some fairly horrid weather – snow, frost, rain, more frost, and then a relatively hot sunny spell in early March. Nevertheless, they flowered in April: the original mystery one turned out to be *Ophrys reinholdii* and the two "Bee orchids" *Ophrys cretica* – see photo. Later, the bees proper and the pyramidals flowered beautifully. By this time the 'Mediterranean three' had gone well over, but their blackened remains can just be made out in the second photo. Other unknown orchids appeared on the bank this year, but only leaf rosettes: a few more *Ophrys* and some others, possibly *Serapias* or some *Anacamptis* such as *longicornu* or *champagneuxii*, and even more remarkably, a rosette of shiny spotted leaves, which must be either *Orchis mascula* (Early Purple) or *O. provincialis*, neither of which I have grown from seed, but I have scattered seed of both in previous years. Things are getting interesting!

So what have I learned from all this ? I have stated in the past, and still believe, that growing Mediterranean natives outside is fraught with difficulties and liable to end in frustrating disaster. In general I still believe this, but the success outlined above is encouraging and largely due to the fact that I am in a position to: a) have plenty of material to experiment with, and b) can monitor proceedings on a more or less day to day basis. The weather has proved not to be a problem; as we should know by now, they get some very nasty weather in the med during the winter, although I am sur-

prised at the resilience of these plants suffering rain and hard frost in the same 24 hours period, and coming up smiling (well, flowering anyway)! The climate in winter here is fairly mild but wet, and we suffer from the ‘four seasons in one day’ syndrome, which is not something orchids, or for that matter any other winter-growing plants, enjoy. The lowest night temperature I recorded last winter was only -7°C ; -12°C is the lowest for the whole five years. But these low temperatures can follow a very wet day or a very bright and warm one; such strong contrasts are not ideal for plant growth! The anticipated mollusc problem was not as bad as expected. I think this is due the fact the plants were planted as tubers and came through the ground naturally by themselves, as opposed to planting out plants in leaf. If the latter is done slugs and snails home in on the newcomers like pigs around a trough, because they are new to the area. I discovered this the hard way ! Established plants may get the odd nibble, but are not entirely destroyed, and once the leaves have hardened they are not troubled further.

The bank itself faces due south and is about 40 feet long and 12 ft down the hypotenuse. The soil is nothing special, in fact just the opposite: a mixture of reasonable but heavy calcareous loam and two kinds of clay, one grey, sticky, but friable when dry, the other yellow, heavier, claggy, and drying to concrete, and interspersed with stones and boulders of hard carboniferous limestone. Underneath is almost entirely clay and bedrock. I have done virtually nothing to improve the soil but did try to select planting sites according to soil quality. Despite the poor drainage qualities of the soil itself, the slope of about 30 degrees compensates, and the soil dries out quite readily in the summer. This allows the mediterranean species to undergo a dry summer dormancy without problems. Being south facing the bank receives nearly all the sun there is, except in darkest winter, when the sun goes below the level of the greenhouse for part of each day in January (assuming it comes out in the first place!)



Ophrys cretica & *Ophrys reinholdii*

Photo: Richard Manuel

I am sure now that planting out dormant tubers in the late summer – late August or Sept - is the best way to start. Dig a small hole about 3 or 4 inches deep (unless the tubers are metric, in which case 7 – 10cm) without compressing the soil around the edge, and mix the native soil about 50:50 with some of your orchid potting compost. Put some of this mix in the hole and position the tuber with its top about 1.5” (4cm) below ground level, deeper if the tuber is a big one, say more than 3cm long, and fill in carefully with more of the soil/compost mixture. Replacing the bit of turf from the top of the hole is a good refinement; marking the spot with a suitable label is also a good idea, at least until the leaves appear above ground. If the soil is dry at the time, watering-in is probably a good idea.

Some maintenance of the growing plants during the winter is necessary, you can't just leave them to their own devices or nasty things can happen. In Autumn, when the leaves are young and tender, wet dead leaves settling on top of them are highly undesirable, causing all sorts of rots, and a refuge for slugs, so these must be removed on (ideally) a daily basis. Any coarse, vigorous, weeds in the area, such as plantains, moon daisies, clover, even birds-foot trefoil, etc, that appear should be pulled out, carefully if they are close to orchid plants.

The most interesting result is that the plants clearly grow much better outside. The Bee Orchids I planted out did much better than others of the same batch that remained in pots. And the Mediterranean Three were certainly no worse than their brothers indoors. Nearly all of the Bee Orchids outside flowered, as opposed to only one in a pot in the greenhouse. The few remaining in the greenhouse are showing no sign of growth yet (as I write) but those outside already have a good leaf or two showing. This agrees with my experience (and that of other growers I know) with cypripediums and some other orchids, which grow faster, better, and flower sooner, when grown outside, than they do in pots. Perhaps I'll write about these another time.

Editorial Postscript

I had planned a final editorial comment, but due to space had to abandon my original planned comments. As this is my last Journal, I would like to thank the members of the HOS Committee for all their support and encouragement over the past three years. It has been a steep learning curve, but also a fascinating and worthwhile experience and I will leave enriched by the privilege of having contact with so many enthusiasts and experts. Thank you as well to the contributors who have put up with my mangling of their articles and pictures. I'll pass on unused articles to the new editor.

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