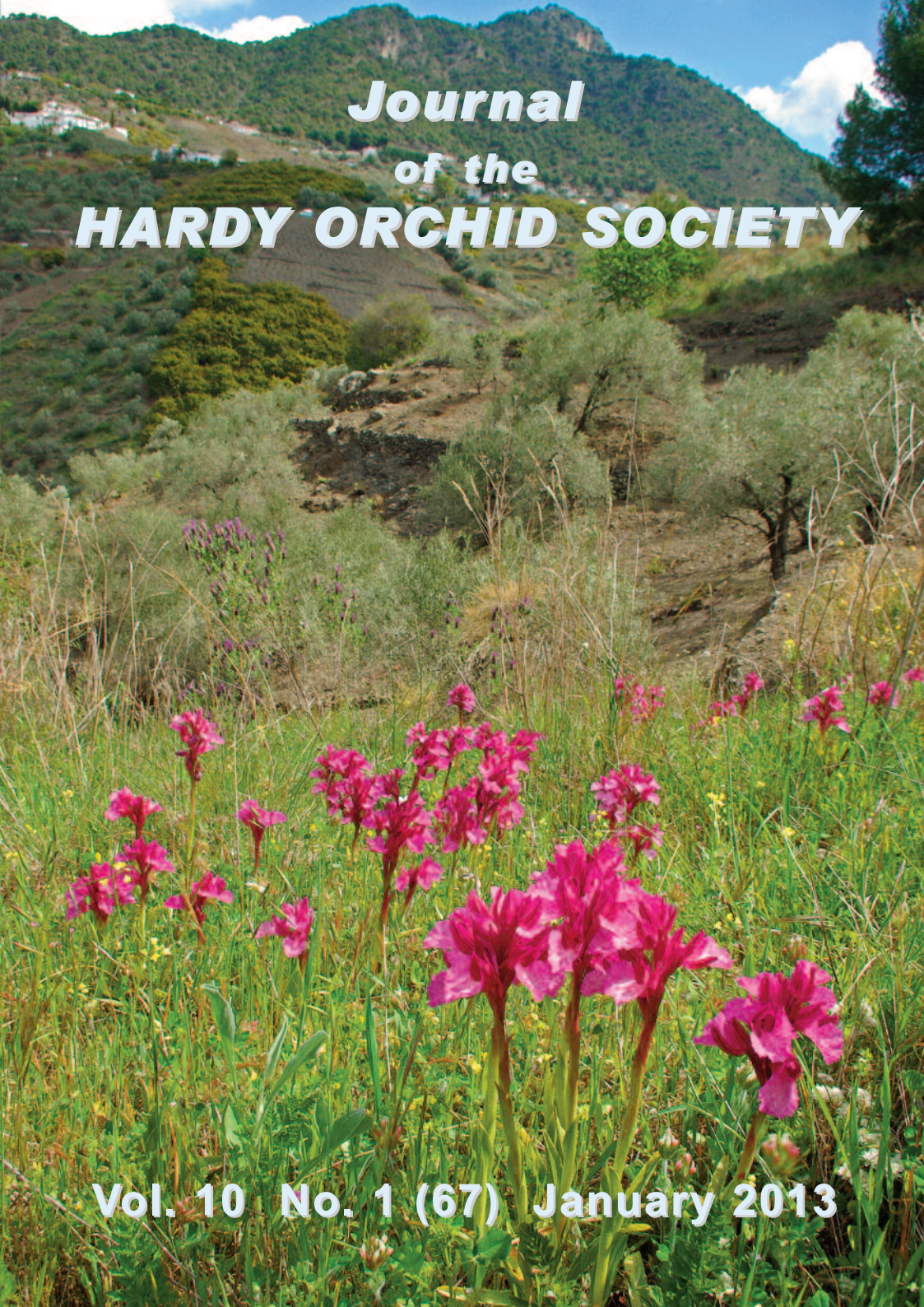

Journal of the HARDY ORCHID SOCIETY

Vol. 10 No. 1 (67) January 2013

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 **www.hardyorchidsociety.org.uk**, January 2004 Journal, Members' Handbook or contact the Editor). Views expressed in journal articles are those of their author(s) and may not reflect those of HOS.

The Hardy Orchid Society Committee

Front Cover Photograph

Landscape featuring *Anacamptis papilionacea* by Tony Hughes, the winning entry in Class 1 of the Photographic Competition 2012.

Contents

Editorial Note

Conservation issues dominate the articles in this issue, including the third and final part of a series by Svante Malmgren and John Haggar. I have included some additional thoughts in a small piece myself, which has been independently refereed. It is important to remind readers that these articles are personal perspectives and do not represent the views of HOS. Also, I am really pleased to be able to include a further article on Kentish Lady Orchids from Alfred Gay. Alfred and his father, Peter Gay, are expert local naturalists and know much about the herbivore threatened colony that has been featured in several earlier *JHOS* articles. We have made significant progress in raising awareness of this problem and hope to provide further news after the next orchid season.

Chairman's Note

Celia Wright

A happy New Year to you all. I'm writing this in the cold days of December but looking forward to the warmth of next year and all the orchid related activities that it will bring. Our Kidlington meeting in November was attended by over 100 members and their guests and a thoroughly good time was had by all. Our meetings for 2013 start at Kidlington on 21st April. I hope we will have news for you all then that the new HOS website is up and running with details of how to access it. It should make finding the items that interest you easier than at present and allow us to add new features in the future. I am delighted to tell you that Svante Malmgren is joining us from Sweden as an expert speaker, a treat for us all. A booking form is enclosed with this issue of the Journal.

HOS now has a presence on Facebook, ably managed by Simon Tarrant. For those of you who have Facebook accounts, do have a look at our page and get in touch with Simon if you have any suggestions for material we might put there. Our aim is to improve knowledge of HOS and hence recruit new members, while being careful not to offer personal information about members and officers of the society. We are particularly keen to get more students with an orchid or horticultural interest to join the society and come to meetings. The committee has discussed how we might do this, but suggestions from members on this subject would be very welcome. You will find details of this year's Field Trips in this copy of the Journal. As usual, Malcolm has organised a varied programme that will extend to Scotland for only the second time in HOS history. Do come to one or more if you can.

I wrote in the October Journal of my concerns about filling committee vacancies. I remain concerned that we do not currently have a Vice Chairman and worry that other roles will become just as difficult to fill as they fall vacant. We have a large membership, many of whom I know to be very capable people, so do please think hard about whether you could help in any way and contact me for an informal chat if you have any interest at all. You can email me (celia.wright@tiscali.co.uk) or phone (01743 884576). My best wishes to you all.

Hardy Orchid Society Publicity

Simon Tarrant

HOS has a publicity display stand with informative posters and photographs and we are always looking for new venues or events at which we can use our display to promote an interest in hardy orchids and, hopefully, recruit new members to the Society. For example, I am working with some of the Wildlife Trusts in south-east England to set up our publicity in various visitor centres. If you are involved in any events or locations where you think our publicity display would be welcomed, I'd love to hear from you. Email me at s.tarrant@virgin.net or phone 01245 231437.

You have probably seen codes like those below proliferating everywhere. They are called QR Codes (Quick Response Codes) and they enable smart phone users to connect to specific Internet addresses. We have created codes to take you to the main HOS website (1), the HOS Facebook pages (2) or to the Facebook 'Like' option (3). As we re-print our publicity material we will start to incorporate these codes.

1 2 3

Field Meetings 2013

Malcolm Brownsword

The 2013 programme of field meetings commences on 5th May. As always, only HOS members are eligible to attend and numbers are limited to a maximum of 15, unless otherwise stated. Membership numbers must be supplied to the local field meeting leader when applying to attend. Members are responsible for their own safety and must ensure that they are suitably equipped for the conditions to be encountered. Packed lunches are usually required. Occasionally a leader may change the date of a field trip due to early or later than expected flowering, in which case appropriate warning will be given. It is the Society's policy, where appropriate, for leaders to ask members to make a donation (£3 per person is suggested) to host organisations. **It is important that orchids and orchid sites are not damaged.** For full details and booking contact the appropriate local leader by e-mail. For those who are not on e-mail, write to Malcolm Brownsword, 14, Manor Close, West Hagbourne, Didcot, Oxon, OX11 0NQ. To avoid disappointment, please book early. Contact Malcolm Brownsword malcolm.brownsword@tesco.net if you have a general query, and particularly if you are willing to lead a field trip in the future.

Sunday 5th May: north east of Oxford to see vast numbers of *Anacamptis morio* and a few *Dactylorhiza incarnata*, as well as many other plants, in ancient hay meadows, followed by a trip in the afternoon to a second nature reserve.
Contact Malcolm Brownsword malcolm.brownsword@tesco.net
Sunday 19th May: near Guildford, Surrey to see Bird's-nest, Fly and Greater Butterfly Orchids, White Helleborine and Common Twayblade as well as early butterflies at two reserves on the North Downs.
Contact Gillian Elsom gillianelsom@live.co.uk
Sunday 2nd June: near Oswestry, Shropshire to visit an ancient hay meadow with six species of orchid, notably Frog Orchid, as well as many other plants, followed by a visit in the afternoon to a nearby nature reserve. Led by Marylyn Howard.
Contact the field meetings coordinator malcolm.brownsword@tesco.net
Saturday 15th June: North Dorset Downs, near Shaftesbury to see *Dactylorhiza maculata, Platanthera bifolia, Dactylorhiza fuchsii* and other orchids**.**
Contact David Hughes davidcchughes@talktalk.net
Sunday 16th June: near Princes Risborough, Buckinghamshire to see about 15,000 flowering *Gymnadenia conopsea*, as well as large numbers of *Dactylorhiza fuchsii, Neottia ovata* and other orchids. Hybrids between *Gymnadenia conopsea* and *Dactylorhiza fuchsii* are a strong possibility here. In the afternoon we will visit another site to look for *Herminium monorchis*. Also good for butterflies.
Contact Malcolm Brownsword malcolm.brownsword@tesco.net
Tuesday 25th June: South Cumbria in limestone country, starting from Tebay on a circular tour for Dactylorhiza, Gymnadenia, bi- and intergeneric hybrids, and Small White Orchid.
Contact Alan Gendle. alan@gendle.plus.com
Sunday 30th June: Pitlochry, Perthshire for visits to three sites with the possibility of seeing Early Marsh Orchid, Northern Marsh Orchid, Heath Fragrant Orchid, Heath Spotted Orchid, Common Spotted Orchid, Greater Butterfly Orchid, Bird's-nest Orchid and Small White Orchid. This meeting is likely to be restricted to ten members.
Contact Alan Bousfield alan.bousfield@ukgateway.net
Tuesday 9th July: near Kingsclere, N.Hampshire to visit a hill fort for *Neotinea ustulata* var. *aestivalis* and other chalk downland orchids.
Contact Bill Temple bill@billtemple.f9.co.uk
Sunday 14th July: Tynedale and Holy Island, Northumberland principally for the Tyne and Lindisfarne helleborines but also many other more common species.
Contact Colin Scrutton colin.scrutton@dunelm.org.uk
Saturday 10th August: Near Bridgend, Glamorgan to see late-flowering helleborines such as *Epipactis helleborine* and its *neerlandica* variety plus *Epipactis phyllanthes* and its *cambrensis* variety. Also the possibility of seeing the three late-flowering varieties of *Epipactis palustris*: *ochroleuca, albiflora* and *ericetorum*.
Contact Mike Clark mj-dgclarkwildlife@hotmail.co.uk

HOS Meeting Programme 2013

Sunday 21st April: Spring Meeting, Plant Show & AGM at Kidlington
Saturday 7th September: Northern Meeting at St. Chad's, Leeds
Sunday 17th November: Southern Meeting & Photographic Show at Kidlington

Wild Orchids of Scotland

Tuesday June 25th to Saturday 29th 2013, Field Studies Council at Kindrogan
http://www.field-studies-council.org/individuals-and-families/courses/2013/kd/wild-orchids-of-scotland-40526.aspx

Results of Photographic Competition 2012

Class 1. A wide area view (landscape or habitat) showing orchids in their natural environment, print size up to 7x5 inches (18 entries)

1st Tony Hughes - *Anacamptis papilionacea* [Cover Photograph]
2nd Tom Turner - *Orchis mascula*
3rd Patrick Marks - *Orchis italica*

Class 2. A group of at least three orchid plants. These can be all the same species/hybrids or a mixed group, print size up to 7x5 inches (23 entries)

1st Roger Hall - *Anacamptis morio* [Figure 2-1]
2nd David Pearce - *Anacamptis morio*
3rd Tony Hughes - *Orchis olbiensis*

Class 3. A single orchid plant, usually the single stem arising from one tuber, print size up to 7x5 inches (22 entries)

1st David Pearce - *Epipactis atrorubens* [Figure 3-1]
2nd Ruth Brown - *Dactylorhiza sambucina*
3rd Richard Jones - *Ophrys speculum*

Class 4. A close-up of an orchid, print size up to 7x5 inches (24 entries)

1st Hilary Pickersgill - *Orchis spitzelli* [Figure 4-1]
2nd Nigel Johnson - *Goodyera repens*
3rd Tony Hughes - *Anacamptis papilionacea*

Class 5. A wide area view (landscape or habitat) showing orchids in their natural environment, print size up to A4 (19 entries)

1st Tony Hughes - *Dactylorhiza fuchsii* & *D. praetermissa*
2nd Tom Turner - *Orchis mascula*
3rd Patrick Marks - *Orchis italica*

Class 6. A group of at least three orchid plants. These can be all the same species/hybrids or a mixed group, print size up to A4 (23 entries)

1st Tom Turner - *Neotinea ustulata* [Maren Talbot Trophy - Figure 6-1]
2nd Alan Pearson - *Orchis anthropophora*
3rd Colin Rainbow - *Gymnadenia conopsea*

Class 7. A single orchid plant, usually the single stem arising from one tuber, print size up to A4 (see Rule 9) (22 entries)

1st Colin Rainbow - *Anacamptis morio* [Figure 7-1]
2nd Ron Harrison - *Dactylorhiza maculata*
3rd Ruth Brown - *Epipactis microphylla*

Class 8. A close-up of an orchid, print size up to A4 (24 entries)

1st Tom Turner - *Neotinia ustulata* [Figure 8-1]
2nd Tony Hughes - *Orchis olbiensis*
3rd Nigel Johnson - *Orchis quadripunctata*

Class 9. A wide area view (landscape or habitat) showing orchids in their natural environment, maximum size 1400 pixels wide and 1050 pixels high (12 entries)

1st Patrick Marks - *Himantoglossum robertianum*
2nd Eric Gendle - Group of several orchid species
3rd Ruth Brown - *Orchis mascula*

Class 10. A group of at least three orchid plants. These can be all the same species/hybrids or a mixed group, maximum size 1400 pixels wide and 1050 pixels high (16 entries)

1st Phil Smith - *Cephalanthera damasonium* [Figure 10-1]
2nd Mike Waller - *Hammarbya paludosa*
3rd Patrick Marks - *Dactylorhiza incarnata*

Class 11. A single orchid plant, usually the single stem arising from one tuber, maximum size 1400 pixels wide and 1050 pixels high (18 entries)

1st Colin Rainbow - *Anacamptis morio* [Figure 11-1]
2nd Mike Waller - *Neottia cordata*
3rd Phil Smit - *Dactylorhiza ebudensis*

Class 12. A close-up of an orchid (see Rule 8), maximum size 1400 pixels wide and 1050 pixels high (24 entries)

1st Phil Smith - *Serapias parviflora* [Figure 12-1]
2nd Eric Gendle - *Ophrys insectifera*
3rd Colin Scrutton - *Caleana major*

Class 13. Novice Class, any hardy orchid print, size up to A4 (13 entries)

1st Alan Pearson - *Serapias cordigera*
2nd Steve Pickersgill - *Ophrys fuciflora*
3rd Colin Rainbow - *Spiranthes spiralis*

Maren Talbot Photographic Trophy: Tom Turner for his print in Class 6

Best Projected Image: Colin Rainbow in Class 1

Our Thanks to the Competition Judge: Peter Brandham

Some winning images are featured on the following three pages. More images will be included in the next *JHOS* and a complete set of the first, second and third placed photographs are on the website at www.hardyorchidsociety.org.uk.


11-1


7-1


3-1


10-1


8-1


12-1


4-1


2-1

Further Notes on *Orchis purpurea* Herbivory and Conservation

Alfred Gay

In the January 2012 edition of the *Journal of the Hardy Orchid Society*, David Johnson and Mike Gasson (Johnson, 2012; Gasson, 2012) drew attention to the worrying status of one of the largest Kentish colonies of *O. purpurea*. The near total herbivory of flowering plants in this beech plantation every year since 2007, and the unusual character of much of the damage, as previously reported by Alan Blackman (Blackman, 2008) and Derek Larter (Larter, 2008), has led to plenty of speculation regarding the culprit or culprits responsible. Deer, and in particular the Reeve's Muntjac, have frequently been suggested as a likely cause of the damage. Years when the Lady Orchids have been heavily browsed at this site have been recorded sporadically over the last 20 to 30 years – the notebook of Francis Rose records such an event in 1990. However, the last 6 consecutive years of very high levels of herbivory, resulting in very few (if any) plants surviving to set seed, are certainly without precedent and raise serious concerns regarding the future of this population.

The suggestion that deer are responsible for the damage to the Lady Orchid population here has been around for some time. In Derek Turner Ettlinger's *Illustrations of British and Irish Orchids* the author includes a photo of *O. purpurea* from this site with a comment that the colony is 'heavily predated by deer'. However, at present, deer are only very thinly established in East Kent. The only species that is frequently recorded is the Fallow Deer (Philp 2002) and even this in quite low numbers – I know of only two wild populations on the North Downs east of the River Stour, one between the villages of Stowting and Elmsted (quite close to the Kent Wildlife Trust reserves of Yockletts Bank and Spong Wood), and the other in the vicinity of Wye National Nature Reserve. There are larger populations just to the west of the Stour in Kings Wood, and they have also been recorded in Denge Wood. Fortunately the Reeves Muntjac remains absent from East Kent, though given the rate of its spread across the rest of southern England, assisted by accidental and deliberate releases, its arrival can be expected soon (Chapman *et al*. 2008). Similarly, Roe Deer remain largely confined to West Kent and to my knowledge there are no records from east of the River Stour.

Given the relative scarcity of deer in East Kent, it would seem unlikely that they are responsible for the loss of flowering spikes at this particular site. I would be inclined to share David Johnson's view that rabbits are responsible for a share of the damage

Fig. 1 Close up of *Orchis purpurea* in Kent
Fig. 2: Landscape of the beech plantation where the Lady Orchids are subject to herbivore damage
Photos by Alfred Gay

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Fig. 3: Lady Orchid with herbivore damage Photo by Alfred Gay

– they have greatly increased in the last few years and there are plenty of them in the surrounding woods and fields. However, they cannot be the cause of the type of damage referred to by Alan Blackman (the nipping of individual florets as illustrated in the photograph) that was very prevalent in 2007 and in the years since. In my opinion, birds or invertebrates would be more likely candidates for this type of damage and the rearing and feeding of a population of pheasants very close to the *O. purpurea* colony would perhaps make these game-birds prime suspects. I have certainly seen pheasants amongst the Lady Orchids on more than one occasion although I have not witnessed them eating any Lady Orchid flowers or yet noticed any similar damage in other pheasant-rearing woods with Lady Orchid populations.

Although the Lady Orchids at this site flowered very poorly in the 2012 season, there were noticeably fewer plants that had been nipped, browsed or eaten off at the stem than in previous years. Rather, the poor flowering appeared to be due to plants choosing not to flower, which was consistent with several other East Kent sites I visited – perhaps the preceding dry autumn and the heavy snowfall in February were responsible. However, I worry that over the last 6 years or so, there has also been a decline in non-flowering Lady Orchid rosettes, a trend that would not be surprising given the lack of any plants surviving to set seed, but could also be due to the plantation becoming less suitable than it once was. Whilst beech is one of the most frequent associates of *O. purpurea* (Rose 1948), the orchid's abundance under deep shade at this site is fairly atypical compared to its other strong colonies in East Kent, most of which occur in the comparatively well-lit environs of the grassland-scrub-woodland edge, or in woodland that is regularly coppiced, typically under hazel. It is also worth noting that many of the beech trees are quite young, though the plantation (on an ancient woodland site) dates back to 1948. A similar, but more mature plantation exists a few miles further north but holds far smaller numbers of *O. purpurea* and larger populations of *Cephalanthera damasonium* and *Epipactis helleborine*.

In 2002, some sensitive thinning of the beech was undertaken on the advice of Francis Rose and a few other local naturalists, due to concerns that the plantation

was becoming too dark. Declines in populations of *O. purpurea* as woodland matures have been documented at several sites and can occur very rapidly – one particular colony under hazel coppice a few miles further east declined every year from approximately 400 flowering plants in 2003 to under 50 flowering spikes in 2011. However, the results of the thinning of the beech were mixed at best; although Lady Orchid numbers remained fairly stable in the immediate years, there was a noticeable increase in the ground cover of brambles and the regeneration of sycamore and ash. This illustrates the challenges of conserving populations of *O. purpurea* as it is very difficult to find a solution that is guaranteed to work. As David Johnson points out, opening up a woodland can also encourage rabbits to move in and graze off Lady Orchid spikes, although equally they can assist control of less desirable vigorous vegetation. Additionally, it seems clear that some shade is important to preserve soil moisture levels and to reduce the spread of competitive grasses, ensuring that there is some open ground suitable for seed germination.

It may be that given these particular habitat preferences, Lady Orchid populations have always been prone to fluctuations in abundance as woodland is coppiced and then allowed to mature. The most suitable woodlands are probably those with a high level of structural diversity, with some open grassland and a high proportion of scrub. It is interesting to note that whilst it seems likely that some East Kent Lady Orchid populations declined in the latter half of the 20th century, very few colonies have been lost. The species exhibits a remarkable ability to persist in low numbers, often in the secluded corners of an old hazel thicket, or clustered around the roots of a magnificent beech tree. The recording of the Lady Orchid in 44 tetrads in Eric Philp's *A New Atlas of the Kent Flora* (2010) is a slight decrease from 48 tetrads in the original 1981 *Atlas of the Kent Flora*. It illustrates this persistence, and I suspect this latest figure may be an under recording.

With regards to this beech plantation colony, the first concern must be to establish finally what has been eating all the Lady Orchid flowers in recent years. It would perhaps also be advantageous to try to increase the amount of suitable habitat by opening up some of the adjacent woodland in a sensitive way and monitoring the results – I was notified by one naturalist that the grassland just outside the wood also used to hold large numbers of Lady Orchid as well as Musk Orchid, although this has since been ploughed and improved.

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HOS Summer Field Trips 2012

Malcolm Brownsword

Sunday 27th May to Shropshire, led by Marylyn & Malcolm Howard

At Whitegates there is a meadow which has never 'seen' artificial fertilisers or pesticides. After a very cold spring the Frog Orchids seemed loath to appear. Up to May 14th only 23 were evident, and they were very small and subject to frost and hurricane force winds. We greeted the prospect of the HOS visit with trepidation, but the sun shone! We had Early Purple Orchids, largish Greater Butterfly Orchids, a lot of Twayblades and some 66 Frog Orchids to show our twenty visitors. Following our introductory talk, a good morning was had by all, with bodies prostrate all over the site, taking photographs of the orchids. During lunch two possibilities were offered: a walk to the SSSI at Llynclys Common or a ride to see more orchids and a promise of seeing Pearl-bordered Fritillaries and nesting Peregrine Falcons.

Fig. 1: Greater Butterfly Orchid at Whitegates
Photo by Charlie Philpotts

The first option was taken by all members, followed by a visit to Llanymynech Rocks. Notable on the walk were Grizzled Skipper butterflies, in addition to the usual orchids dotted among the disused and overgrown quarry workings that are part of the SSSI. Hot and weary, the party arrived back at 'Whitegates' at 3.30 for tea, biscuits and cold drinks.

Our thanks go to Andrew McDougall and Denys Morton for helping with parking and doing the washing-up and to Alan Bousfield for sending us photographs afterwards. Several members asked if they could come again!

Wednesday 30th May to Suffolk, led by Mike Gasson

This trip was held midweek and attracted a full complement of HOS members. The weather forecast was for a showery day but we were blessed with fine weather and the kind of bright cloudy conditions that often make for good photography. The day began with a minor trauma as some of us got lost amongst the complex of forest tracks but with judicious use of mobile phones we managed to gather at the disused chalk pit that boasts the East Anglian population of *Orchis militaris*. We were kindly hosted by the Forestry Commission who own and now manage the Rex Graham Reserve. Although the season was rather late, there were sufficient well-open orchids to keep the photographers entertained. The site seemed to be in good order and a useful development since my last visit was the protection of an extension area with a surrounding, deer-proof fence. This includes a shallow scrape going down to the chalk where Military Orchids have appeared in the past, only to serve as deer food. It was good to see an expanding and healthy population in this area.

After lunch we travelled to a fen site in the Waveney Valley noted for the presence of a small population of the cream-coloured Early Marsh Orchid *Dactylorhiza incarnata* subsp. *ochroleuca*. A significant cluster of plants was present, but in such a late season, most remained in bud. Fortunately we were able to enjoy a relatively isolated plant with open flowers that could be photographed without risking damage to the main population. Other orchids on show included an intriguing population of Marsh Orchids with what has recently been re-christened *Dactylorhiza praetermissa* subsp. *schoenophila* by Richard Bateman and Ian Denholm (formerly *D. traunsteineroides* / Pugsley's Marsh Orchid). A rather more typical Southern Marsh Orchid was in flower alongside its hybrid with the Common Spotted Orchid.

Several members enjoyed other nearby sites either before or after the field trip with another Waveney Valley site and the National Trust's Wicken Fen providing a range of Early Marsh Orchids. A collection from the attendees was donated to the Suffolk Wildlife Trust.

Saturday 9th June to Chafford Hundred led by Mike Parsons

We had a good fine day at Chafford Gorge in Essex on the 9th June. We were very lucky as the weather forecast was for rain and it had rained heavily the day before and continued in the same vein the following day. Eight members turned up at the very good visitors centre which has great views of the other side of the gorge. We looked down drinking our cups of coffee before heading in the other direction into a grassy walkway which led into the best areas for seeing orchids. We first encountered *Dactylorhiza fuchsii* (Common Spotted-orchid) and *Neottia (Listera) ovata* (Common Twayblade) in most areas, mainly beside the paths. The gorge is well known for Round-leaved wintergreen (*Pyrola rotundiflora*) and we were not disappointed as there were many there and nearby were some *Ophrys apifera* (Bee Orchid) still in bud.

Fig. 2: Common Spotted Orchid at Chafford Hundred
Photo by Simon Tarrant

Further on we found some Bird's Nest Orchids (*Neottia nidus-avis*) which were just going over, and nearby just emerging were a few leaves of Green-flowered Helleborine (*Epipactis phyllanthes*). In the open areas there were quite a number of Man Orchids (*Orchis anthropophora*), some very large, which was better than last year when it was very dry.

On ascending some steep stairs to the brim of the gorge we found more Man Orchids and some Pyramidal Orchids (*Anacamptis pyramidalis)* just opening their first buds. The only orchids not found this year but found last year were *Dactylorhiza praetermissa* (Southern Marsh Orchid) & *Epipactis helleborine* (Broad-leaved helleborine).

Saturday 23th June to East Kent, led by Alan Blackman

Eleven HOS members met on a dry but very windy morning on the hills above Folkestone. Unknown to me was the fact that the meeting point was also the starting point for a sponsored run along the Saxon Shore Way! After sorting out HOS members from people dressed variously as Romans, Olympic torch bearers, Father Christmas, and Harlequin clowns, we set off for the first site.

More than 50 flowering spikes of *Ophrys fuciflora* were found, most in good condition, and one probable hybrid *O. fuciflora* × *Ophrys apifera*. Also present were *O. apifera*, *Anacamptis* pyramidalis, *Dactylorhiza fuchsii*, and some gone-over *Orchis anthropophora*. Other interesting species were some lovely Musk Thistle and Yellow-hammers calling from the hedgerow.

We re-convened in the afternoon at Sandwich Bay Bird Observatory and made our way across the golf-course, through the dunes to the coast road. On the way were many *Himantoglossum hircinum* in lovely condition despite the strong wind, *Anacamptis pyramidalis, Orobanche minor*, *Orobanche caryophyllacea*, Sea

Fig. 3: *Orchis militaris* in Suffolk
Fig. 4: *Dactylorhiza incarnata* subsp. *ochroleuca* in Suffolk
Fig. 5: *Dactylorhiza viridis* at Whitegates
Fig. 6: *Orchis anthropophora* at Chafford Hundred
Photos by Mike Gasson (3 & 4), Charlie Philpotts (5) & Simon Tarrant (6)


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Bindweed and Bog Pimpernel. Along the edge of the coast road were hundreds of *Himantoglossum hircinum*, along with more *Anacamptis pyramidalis*, the tiny and rare Sand Catchfly (*Silene conica*), and lots more of the two broomrape species. In an area that is damp in the winter there were good numbers of *Dactylorhiza praetermissa*, along with more *Anacamptis pyramidalis*, *Neottia ovata* (in seed) and a few *Gymnadenia conopsea*. The *Dactylorhiza praetermissa* were very variable with many showing leaf spots ('pardalina' form with ring-shaped spots) and one with very narrow tri-lobed lips ("dagger-lipped", as has been described for *D. fuchsii*). Despite the very windy conditions it was a very successful and enjoyable day.

Tuesday 3rd and Sunday 8th July to Oxfordshire, led by Malcolm Brownsword
A party of five joined me for my 'recce'on the 3rd, and twelve members on the 8th, to Dry Sandford Pit, Parsonage Moor and Cothill Fen, near Abingdon. On the 3rd, before lunch, the party admired vast numbers of *Epipactis pallustris*, as well as fine specimens of *Dactylorhiza fuchsii* and *Neottia ovata*. There was no sign of *Gymnadenia densiflora* in an area where a few are often found. Two Marbled White butterflies were driven to cover by a heavy shower and a nationally rare, but locally fairly common, Southern Damselfly was spotted. After lunch, we walked on to Parsonage Moor, where there were many fewer *Epipactis* than seen in the morning, but we did find several specimens of Pugsley's Marsh-orchid (*Dactylorhiza praetermissa* subsp. *schoenophila*) and several groups of Butterwort.

On the 8th, in addition to the above, we found a single specimen of *Gymnadenia densiflora*, unfortunately recently severed, and three flowering *Ophrys apifera*. The rare Small Red Damselfly was also seen, as well as a crab spider and a large leech in one of the small ponds on Parsonage Moor. Further specimens of Pugsley's Marsh-orchid were seen in Cothill Fen. A collection for the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust on each day raised a total of £50.

Wednesday 25th July to Grasmere, led by Alan Gendle
A group of 13 members set off from Grasmere village square at 10.00 a.m. and was soon commencing the steep climb up to a remote tarn. After several stops to admire the view we reached our destination at about 800 feet. Searching along one of the gullies that drain the moss we located our first Bog Orchids (*Hammarbya paludosa)*. A count of the orchids was carried out for the county records. A total of 44 flowering spikes were observed. By 14.00 we were all safely back in Grasmere.

Fig. 7: *Gymnadenia densiflora* in Oxfordshire
Fig. 8: *Herminium monorchis* in Buckinghamshire
Fig. 9: *Dactylorhiza praetermissa* var. *pardalina* in Kent
Fig. 10: *Epipactis phyllanthes* at Kenfig
Photos by Malcolm Brownsword (7 & 8), Alan Blackman (9) & Mike Clark (10)


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Fig. 11: Variegated form of *Epipactis purpurata* from Buckinghamshire
Photo by Hilary Pickersgill

Sunday 29th July to Buckinghamshire, led by Malcolm Brownsword

My thanks to HOS members Hilary Pickersgill and Peter Daltry for local information regarding the later-flowering helleborines. On arrival at the car park near Princes Risborough we soon found several *Epipactis purpurata* but none of them were in flower. After a short walk we found many more of the species, all non-flowering. A subsequent visit by Hilary demonstrated that they eventually flowered two weeks later than in the previous year. We did find a few *Epipactis helleborine* in flower and several of what we believe to be the hybrid between *E. helleborine* and *E. purpurata.* Travelling along the narrow roads in the region we went to two further locations, the first where *E. purpurata* var. *rosea* had been seen in recent years, but were disappointed to find none. However, we did find a tall multi-stemmed *E. purpurata* with handsome variegated leaves.

After 30 minutes of heavy rain at lunchtime the rain stopped and we had glorious sunshine for the remainder of the day. We drove to Pulpit Hill and about a mile from the car park saw about 50 *Herminium monorchis* (Musk Orchid). Normally one would expect to see them flowering in early rather than late July. Although most of the flowers were 'going over', some fine photographs were taken of small groups by Colin Rainbow, using the focus stacking technique. Large numbers of brown capsules of Chalk Fragrant and Common Spotted-orchids were evident and a few *Anacamptis pyramidalis* and *Dactylorhiza fuchsii* were still in flower in shadier areas. Chalkhill Blue butterflies were on the wing and many Clustered Bellflowers were seen.

Fig. 12: *Epipactis palustris* in Oxfordshire
Fig. 13: *Hammarbya paludosa* at Grasmere
Fig. 14: . *Himantoglossum hircinum* in Kent
Fig. 15: Field trip to Kenfig Dunes
Photos by Malcolm Brownsword (12), Alan Gendle (13), Alan Blackman (14) & Mike Clark (15)


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Sunday 5 August to Kenfig, led by Mike Clark
Ten HOS members met at Kenfig National Nature Reserve Visitor Centre car park. We were lucky to have a sunny day and I had already marked out the target species the day before, so we made our way to the North Dunes, where the first plant seen was a woodland *Epipactis phyllanthes* just coming into flower. Then further on into the Dunes to see a single *E. phyllanthes* var. *cambrensis* on a sand hill. The odd *Dactylorhiza praetermissa* and *Epipactis palustris* were still in flower. We continued to the main *E. phyllanthes* var. *cambrensis* study site, where there were seven plants. The next plants seen were *Epipactis helleborine* var. *neerlandica,* a good number of which were seen in flower. Also, more woodland *E. phyllanthes* were seen in the Birch Copse along with *E. helleborine.* It was an enjoyable day and it just started to spit with rain as we approached the cars.

Much Ado About Almost Nothing? Part 3

Svante Malmgren & John Haggar

The remainder of this essay aims to discuss the wider implications of the introduction of alien genetic material in general, but with particular emphasis on British orchid populations. Does it occur? Will it occur? Does it matter? Should we encourage it in certain circumstances? What are the criteria on which "acceptable" conservation methods based, and who makes the decisions?

In parts 1 and 2 of this article, we have provided evidence to support the conclusion that introgression is probably a very rare event, at least in those species of *Orchis* and *Anacamptis* that may be encountered growing together in the wild. Nonetheless the genetic evidence informs us that such introgression has indeed occurred in the past. Occasional fertile F2 generation hybrids or back-crosses are the likely vehicles whereby this process occurs. To our knowledge, the phenomenon has never been demonstrated to have affected any local population deleteriously and it is the authors' opinion that it will not do so, other than possibly in the special case of mixed diploid and tetraploid populations (e.g. *Dactylorhiza*).

Whilst we would never condone the unsanctioned deliberate introduction of foreign orchids or their seed into a nature reserve or similar setting, it remains a possibility that the Lady Orchids at Hartslock arrived naturally on high-level winds from further south in Europe. What should be done if this is the case, and should we behave differently if the species were proven to have been deliberately introduced? However, we should also focus on an intermediate and maybe more likely possibility. What if the *O. purpurea* seed originated from a plant growing in a garden in a nearby town or village? More and more people are growing hardy European orchids and whilst *O. purpurea* is not commonly cultivated it is certainly available commercially.

As growers of hardy orchids from seed, we can confirm that legislation makes the acquisition of the seed of locally growing native orchids onerous at best and often prohibitively difficult. Consequently we are compelled to use donated or purchased seed of foreign origin. Alternatively, the seed of cultivated plants (again as likely as not of foreign origin) can be used for propagation. Even the HOS seed bank supplies are sourced from growers/members whose "British native" collections are more likely than not to be derived from Continental stock. Of the many native species that JH grows from seed, only a few *Dactylorhiza* species, *Anacamptis pyramidalis* and *Gymnadenia borealis* are derived from British plants. Perhaps unfortunately, this is the case for most cultivated hardy orchids. Each and every edition of *JHOS* contains four or five advertisements from plant nurseries offering hardy orchids for sale. Every year thousands of orchids of variable geographic origins and genetic constitutions are planted in British gardens and meadows. In a globalised world and commercially unified Europe, not only do capital and labour move relatively freely across national borders, but so do European orchids and on a large scale. Whether we like it or not, orchids of non-British origin will be found more and more often in these islands and they will hybridise with the original British plants. Pollinator movement and the orchids' wind-blown method of seed dispersal make this outcome inevitable.

We will now extend our discussion to consider the implications of introducing foreign DNA into native populations of the same species. For the majority of plant species that normally rely on cross-pollination by insects for healthy seed production, there can be little doubt that repeated inbreeding in a small population is bad. A number of orchid species like *Ophrys apifera* and some *Epipactis* species, for example, have become adapted over long periods of time to embrace self-pollination and to use it as a survival strategy, but most orchids repeatedly selfed over multiple generations will end up producing poor quality seed of low fertility, which gives rise to sickly plants with a low survival rate. These observations should be used to guide us in conservation policy. Science can provide us with an informative framework within which decision making can be done after discussion of the alternatives available. Any such discussion will clearly reflect partially conflicting interests and we will give examples of this in the text.

To what extent, then, might inbreeding practically affect orchid conservation projects? Over the long term, repeated selfing in a small isolated population is bound to weaken it but the risk in the shorter term is difficult to measure. One factor is the natural life-span of the plants. *Cypripedium calceolus* individuals can probably live for a century, but most of our native European orchids are much less long-lived perennials with shorter generation turnover times and problems resulting from inbreeding would become evident over a smaller time period. In a world of changing environment, incorporation of novel genes into successive generations is surely

of great importance to adaptation. In small, closed, isolated populations this does not occur. It is difficult to measure the degree of inbreeding in any particular population. DNA variability can be measured, but low genetic variation does not appear to be directly correlated with likelihood of survival. So far, genetic analysis appears to be unable to identify those orchids that are at risk of deterioration from inbreeding but this could be a real problem with some species whose numbers have reached a critical low point.

Seed derived from plants growing in a small, declining population often appears to germinate poorly and gives rise to unhealthy seedlings. As the generations proceed the seed becomes poorer still, the plants less vital and the population declines further suggesting that some form of genetic depletion is occurring as a consequence of multiple homozygous recessive alleles predominating in the individual plants. SM is involved in a Swiss conservation project that aims to propagate six species. One is *Anacamptis palustris*. Seed has been supplied from two rapidly diminishing populations, "Chatz" and "Eigenthal". In one case, seed production is very poor and only a small proportion of the seed contains viable embryos. The seed quality of the second population is also poor. When plants from each group are crossed, however, seed production and quality are greatly improved. In fact, most of the thousand or so plants returned to Switzerland are grown from the crossed seed. One former Swiss population of *Ophrys fuciflora* now consists of just a single wild plant. Only 15 plants could be grown from an entire (selfed) seed capsule. A second generation has been grown to flowering size but only 5-10% of the seeds of these plants appear to have viable embryos. *Ophrys sphegodes* and *O. araneola*, which are also in the project, both retain larger population sizes and their seed production, not surprisingly, is rather better.

Returning to the U.K., we pose the question, "What criteria did the Cypripedium Committee use to work out how to resurrect the Lady's-slipper orchid in England?" Certainly, large numbers of plants were propagated by Kew but many of the planted-out specimens appear to have taken an unexpectedly protracted length of time to flower. Some of the first individuals to be "returned to the wild" at Ingleton in Yorkshire took substantially longer to flower than the six years normal for most cultivated Scandinavian *Cypripedium calceolus*. Some years ago, members of the HOS (including JH) were given the opportunity to grow on specimens of British *C. calceolus* propagated by Kew. Allowing for the fact that the seedlings were quite obviously Kew's "seconds", the majority had comparatively short rootstocks and very poorly formed buds compared with most freshly deflasked cypripediums. It is not therefore surprising that so few survived. We wonder to what extent the entire undertaking might have been facilitated by not choosing to reintroduce plants of exclusively British origin. As it was, some Swiss material was inadvertently included in the breeding program, so the plants that have been grown are not entirely descend-

ed from British specimens after all and may be healthier as a result, but that was not the intention. Great efforts were made to deliberately hunt down (and genetically check) garden specimens believed to have been stripped from the wild in England in recent historical times for use as partners for the last surviving Yorkshire *C. calceolus*. By doing this, however, might we not merely be inbreeding a tiny population straight from a genetic bottle-neck with all the attending problems of poor vigour, slow growth, low fertility and poor disease resistance to look forward to? The Lady's-slipper Orchid is well known to be susceptible to aphid-transmitted potyvirus infection and inbreeding results in decreased resistance to all viral infections. Using substantial quantities of pollen from Scandinavia, France or even from the vigorous Silverdale plant (believed to be of Continental origin) would surely have produced genetically more sound plants with a more vigorous constitution whilst retaining genes from the ancestral British plants at the same time. Is it possible that a somewhat insular British mentality was involved in the decision making? We have to ask ourselves what exactly it is we are trying to conserve and why. The authors believe that we should be working to maintain healthy, self-sustaining populations of slipper orchids for future generations to enjoy, not just preserving the faded genetic fingerprint of the last of the wild British plants.

Another example of a plant "on the brink" in England is *Orchis militaris*. In Britain, it is very rare and found in two areas, Suffolk and the Chiltern Hills. The vigorous Suffolk population, which is confined to a single site, has been shown to demonstrate little genetic variation and this has been interpreted as evidence that the plant is a recent "invader" from Continental Europe but luckily nobody is suggesting that this population not be conserved (contrast the Danish experience, later). Would people think differently, though, if it were proven to have arisen from seed escaped from a garden in a nearby town?

Robust military orchids growing by a roadside in Sweden
Photo by John Haggar

The Chiltern populations, of which there are presently two, have been shown to be genetically more variable, and might be relict colonies of the once more widespread "original" British form. Even so, of course, they must have originated from Continental plants at some time in the not too distant past (Foley and Clarke, 2005). They have been described as a uniquely British variety,

tenuifrons, characterised by being short plants with shorter, narrower leaves and a smaller, fewer-flowered spike when compared with their Continental cousins. Bateman and Rudall (2011) have recently demonstrated that there are actually no statistically significant morphological differences between Chiltern and Continental military orchids and that the genetic differences do not correlate with the morphological variability, making var. *tenuifrons* an obsolete entity. We, the authors, have both been personally involved in trying to propagate plants from seed taken from Chiltern specimens. *Orchis militaris* is not generally a difficult plant to grow from seed, but the Chiltern seed is of poor quality in our experience. There are few seeds in each capsule and many of them have undeveloped embryos. Many seedlings grown from the seed lack vigour and some are deficient in chlorophyll. Survival of the seedlings is poor. The former var. *tenuifrons* appears in these respects to be a genetically depleted population that suffers as a result of excessive inbreeding. How much easier it might be to maintain healthy populations of the military orchid in England if it were invigorated with some fresh genetic material. There can be little doubt that crossing the Chiltern Military Orchids with pollen from plants from Suffolk or Northern France would improve their genetic constitution greatly and would almost certainly have the same effect as has been seen with Swiss *Anacamptis palustris*. Even crossing the two Chiltern populations would probably enhance seed production and seedling viability to some extent. The Chiltern military orchid looks like a plant that could be about to embark on a final decline due to its poor, inbred genetic constitution. There must sometimes be a second-best alternative in conservation projects; to save the species as a British plant and not only a certain (perhaps degenerate) genetic fingerprint. Conservation sometimes means restoration, rather than just preservation, and in this respect DNA-typing can advise us.

Approaching the subject from a slightly different angle, perhaps we should ask what is particularly special about the Monkey Orchids at Hartslock that makes them so deserving of our attentions. Unlike the robust Kentish colonies of *O. simia* which are believed to be of comparatively recent and Continental origin, the rather weak Thames Valley monkeys are thought to be relict representatives of the original English population that have almost vanished completely for a variety of reasons (changes in farming practice, an explosion of the rabbit population and over-collection) over the last hundred and fifty years or so, a situation similar to that we have seen with *O. militaris* (Summerhayes, 1951). But what does this really mean? Considering that both these species are teetering right on the very northernmost edge of their natural European areas of distribution, it can only mean that they are "of comparatively less recent Continental origin". Unlike French plants which are regularly reinvigorated genetically from adjacent sites, this segregated and recently depleted British population must necessarily be weakened by inbreeding and both physical and genetic isolation just as we have suggested is the case for the Chiltern Military Orchid. The injection of a few Continental *Orchis* genes might not altogeth-

Top: Kentish Monkey Orchid
Photo by John Haggar
Middle: *O simia* 1st year on soil
Bottom: Germinating seed of French *O simia*, unwelcome in England
Photos by Svante Malmgren

er be a bad thing for the Oxfordshire monkeys, although a donation from French (or even Kentish) *O. simia* would, of course, be preferable to *O. purpurea* whatever the latter's origin.

Hartslock monkey orchid seed was propagated by Kew as part of the Sainsbury Orchid Conservation Project, but the result was that just a single plant was reintroduced in 1997. According to Harrap and Harrap (2005), Kew's failure could be attributed to low growth and germination rates because of asymbiotic propagation techniques. This is quite wrong. Out bred Monkey Orchid seed is very easy to grow asymbiotically, with a 90-100% germination rate within 4 weeks of sowing, hundreds of plants can be raised from a single seed capsule; Kew's failure was probably a consequence of having to use poor quality inbred seed.

What could happen if we do not intervene to help our most threatened orchids? SM's interest in this subject stems from an occurrence some 18 years ago when a tiny colony of *O. militaris* was found unexpectedly in an old chalk quarry in Jutland, Denmark. As a wild species it was otherwise unknown in the country. A similar discussion as we are having now concerning the Hartslock *O. purpurea* arose then regarding its origin. A few years later, at which time there were six of Denmark's orchid species growing at single sites and in some cases in extremely low numbers, SM wrote an article for the Danish botanical journal "Urt" (Malmgren, 1993). He informed the editors that all these rare species could be propagated fairly easily from seed (collected from Danish plants) and thereby be saved as members of the Danish flora. SM offered to do this.

The responses were negative and contrary. On one hand it was argued that the ability of orchid seed to spread over large distances meant that sooner or later the species in question would naturally become established (or re-established) in the country even if they were allowed to die out. On the other hand, the botanists responding to the article wrote that they would have no control whatsoever over the origin of the plants if SM (or anybody else) dared to grow the species from seed. The offer was fiercely rejected using these two totally contradictory arguments. Spontaneous arrival of foreign seed from far away was perfectly acceptable, whereas the mere possibility that plants be propagated from the seed of (the same) plants of distant origin and planted out was horrifying! Such was the animosity to the suggestion that the journal even refused to publish the formula for the growth medium, and suggested that the very notion of propagating the plants from seed and using them for reintroduction was childish and unachievable.

Nowadays, *Spiranthes spiralis* has disappeared from Denmark and *Ophrys insectifera* very nearly so. *Cypripedium calceolus* hangs on in just a couple of sites in northern Jutland. The chalk quarry harbouring the *Orchis militaris* was filled in and turned into an industrial site. It too is now gone (Pedersen and Faurholt, 2010). At the time of its discovery, however, SM was acquainted with at least three different people on Jutland, not far from the quarry, who were successfully growing military orchids in their gardens. The possibility that Denmark's "wild" colony was derived from these cultivated plants is high. Seed of "foreign" origin does not always have so far to fly nowadays, as we have previously discussed.

What occurred in Denmark appeared to be a pseudoscientific struggle for the jurisdiction of nature itself. In the authors' opinions the Danish botanical community made the wrong decision two decades ago. We both feel that it is important that future decisions regarding our native orchid flora should involve discussion and participation by as wide a range of interested parties as possible, in order that the correct decisions are made for the future. Bodies such as the Hardy Orchid Society provide an ideal forum for such interaction and one main reason for writing this article is to encourage feedback and response. Now that it is possible to propagate most species of European orchid from seed, and that such propagated material is widely available, a new practical dimension has been added to such discussions. So we should decide together if or when active intervention is acceptable and which methods of conservation are appropriate.

Botanists appear to have used two main arguments against the use of artificial propagation and reintroduction as tools in orchid conservation. One relates to geography and the other to the genetic make-up of the plants in question. The genetic constitution of local populations can now be characterised using DNA techniques and many botanists and conservation bodies are keen to preserve this and so wish to prevent

the parish/county/national genetic fingerprint of their native orchids from being contaminated by "foreign" genes. This is probably harmless in most cases but whether it benefits the populations or individual plants in any way is questionable. In the case of rare orchids like the Monkey, Military and Lady's-slipper in England, these attitudes if too strictly applied would appear to be a disadvantage to maintaining healthy populations of the plants in question.

In Sweden there is a saying that "if a hammer is your only tool, it is easy to look upon everything around you as nails". With this sort of conceptual framework, the ability to identify local minor differences in plant morphology or DNA make-up makes it tempting to want to lock in place the current state of affairs for the future. Practical reasons, though, dictate that this is a difficult or impossible strategic position to maintain, however conservative your beliefs and however fundamentalist your stance. We have already mentioned the likely consequences of more and more people growing cultivated hardy orchids of Continental origin in their gardens. The geographic argument is used by many botanical recorders who plot and map the distribution of wild plants. They are averse to the idea of any human intervention in wild plant populations whether it be seeding/planting wild species in new sites or introducing foreign or novel genetic material into pre-existing populations. They argue that the conservation lobby is weakened by such methods and that the techniques invalidate further discoveries of the species in question as being wild plants. It is questionable if this matters to anyone other than the botanists concerned.

Our most visited Monkey Orchid site is the Kent Wildlife Trust's reserve at Park Gate Down. In 2007 it was renamed the Hector Wilks reserve after the local botanist who was responsible for scattering wild-collected seed at the site and thereby introducing *Orchis simia* there in the 1950s and 1960s. Now celebrated as a conservation hero, Hector Wilks' methods were scathingly criticised by Philp (1982) in his "Atlas of the Kent Flora". However, we do have a splendid new population of Monkey Orchids as a result of them. "Acceptable" wind-blown seed has been responsible for establishing new stands of *O. simia* in Kent and of *O. militaris* in Suffolk. It is likely that the sporadic occurrences of *Himantoglossum hircinum* in the south and east of England are a result of the same phenomenon. The Oxfordshire *O. purpurea*, however, might not have arrived in this manner so is less welcome.

Botanically speaking the British Isles are not the Hawaiian Islands, nor New Zealand. Indeed they are really no more than a peninsula of Northwest Europe separated very recently from the Continent by just a narrow channel of water. What if there were a land boundary as in the past? Would local botanists be so concerned if orchid seed were blown across the frontier then? Must all native plants of a particular species necessarily only share the same approximate genetic make-up? How great is an "acceptable" degree of genetic variation? After how many years of

absence might it be permissible to consider re-establishing, locally or totally, a lost British orchid (*Spiranthes aestivalis* is an excellent example in this respect)? Would anyone in France be worried if a plant of *O. purpurea* discovered outside Paris had its seed origin in the south, north, west or even in Germany?

There are dozens of European conservation projects going on, mostly concerning rare birds and mammals. In some cases work is concentrated on stabilising and saving the environment for the species, but in many cases controlled breeding programs (with or without the introduction of "foreign" genes) are also conducted. The approximately 200 Swedish wolves are suffering from the consequences of inbreeding, and wolves from Finland and Russia have been introduced to overcome this deficit. Even in Britain, large numbers of Swedish and Spanish red kites have been introduced to enhance the low rate of chick production by the native birds and Norwegian white-tailed sea eagles are being introduced to coastal Scotland. Why do we not have a similar approach to rare British plants?

How far, then, should genetic or geographic distance influence conservation projects? Strong and proven identification methods for individual plants and populations are impressive, but a strategic retreat to a more flexible position should be accepted as sometimes necessary for species conservation. Personally, we would be very happy to chance upon a plant of *Himantoglossum hircinum*, even if we had our suspicions that it might be the progeny of a foreign field!

We hope this article, which links a number of different subjects of current relevance to European orchidology and leaves more questions posed than answered, will stimulate further debate and discussion.

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Something − Further Thoughts on Rare Orchid Conservation

Mike Gasson

The preceding article completes a series of three by Svante Malmgren and John Haggar and presents their case for the inclusion of an outbreeding strategy when conserving orchids in remnant populations or undertaking re-introduction programmes. Based on their experience and expertise in raising orchids from seed and making crosses between cultivated orchids, they emphasize the well-established benefits of heterosis and the problems associated with inbreeding depression within allogamous species. These indisputable truisms were elegantly exposed in one of Darwin's famous books "*Effects of Cross and Self Fertilisation in the Vegetable Kingdom*" and they impact massively on modern plant breeding strategies for agriculture and horticulture. The Hartslock anthropomorphic orchids that stimulated the "Much Ado About Nothing?" articles clearly illustrate these phenomena. I first encountered the newly discovered *Orchis ×angusticruris* on a misty morning and from a distance, even in poor light, these plants were obvious from their size, standing out (and up) from the surrounding vegetation. Also, the flourishing colony of *Orchis simia*, saved from collectors, the plough and rabbit "herbivory", are rather small specimens, especially when compared with the same species in Kent or continental Europe, a legacy of their passage through a genetic bottleneck.

If this is all so clearly well-established, why do Malmgren and Haggar (2013) need to make their plea that "these observations should be used to guide us in conservation policy"? They suggest that it may relate to geography and the genetic makeup of local populations, and that preserving the latter is driven by a nationalistic, protective view that the rarer British orchids are somehow more special than they really are − "botanically speaking the British Isles are not the Hawaiian Islands". Clearly the best people to respond to this are those responsible for the orchid conservation strategies being pursued in the UK.

I very much doubt that decision making by groups such as the "Cypripedium Committee" is dominated by some sort of misplaced national protectionism. Going to extreme lengths to ensure that re-introduced *Cypripedium calceolus* plants were derived from native sources was more likely based on a minimal intervention philosophy and a conservative approach that recognized the risks associated with another well-established but less frequently exposed genetic phenomenon − outbreeding depression. Scientific theories about inbreeding depression and heterosis include the idea that heterozygotes cover up disadvantageous or lethal recessive genes. There is also the distinct concept of overdominance, whereby the combination of two different alleles of a gene within a heterozygote is superior to either of the alleles when present as individual homozygous pairs. In contrast, outbreeding depression involves the combination of many different alleles of multiple genes that are main-

tained within individual plants to confer a collective advantage in the context of the specific habitat being used. The introduction of new vibrant genetic material intended to rejuvenate an inbred population has the potential to disrupt this carefully adapted genetic balance, thereby creating a risk versus benefit dilemma. Does the clear value of heterosis outweigh the risk of losing the established, well-adapted genetic balance?

These issues have been studied in a variety of plant species with some work in orchids. A useful example is provided by recent work on threatened populations of *Gymnadenia conopsea* in Norway (Sletvold *et al*., 2012). As well as strong inbreeding depression, local outbreeding depression is demonstrated. This leads the authors to conclude: "- conservation programmes often include crossing designs or plant reintroductions to counteract negative consequences of reduced population size and increased isolation. In orchids, little is known of the scale of genetic structure and local adaptation, suggesting that such actions may represent risky options for threatened species." In other plant groups, both inbreeding depression and outbreeding depression have been monitored over longer time periods with pertinent observations. For example, in natural populations of the legume *Chamaecrista fasciculata*, the benefits of restored heterozygosity faded after three generations and the disruption of co-adapted gene complexes became more significant (Fenster & Galloway, 2000). Another important observation from this and other studies is that the extent of outbreeding depression increases with the extent of the genetic gap between recipient and donor populations and this often correlates with geographic distance.

The bottom line in all of this is that deliberately increasing heterozygosity, as championed by Malmgren & Haggar (2013), has clear potential value but it comes with a risk. It is very possible that the benefit outweighs the risk but it does mean that those charged with making key decisions about how to revive remnant rare orchid populations in the UK have a complex task. The UK conservation authorities have undertaken a great deal of work in raising orchids from seed for reintroduction into the environment and the Sainsbury Project is something of a pioneering undertaking. Seeing these introduced plants established, healthy and flowering should not be the final objective. Unless these plants integrate within their new environment, set seed and generate progeny by natural means the whole exercise will be little more than the establishment of a different sort of botanical garden (Bateman 2010). Hence, the genetic strategies adopted need to look beyond the vitality of recently cultured material and consider longer term performance in a natural environment.

With respect to the Lady's-slipper Orchid in Northern England the majority of the reintroduction sites have plants derived exclusively from definitively English plants. In contrast, plants at Natural England's, Gait Barrows reserve include non-British material (Ian Taylor, pers. comm.) making them more compatible with the genetic

strategy promoted by Malmgren & Haggar (2013). The future performance of *Cypripediun calceolus* at these various sites will be of especial interest. Historically, our now rare orchid flora has been subject to shameful abuse and, regardless of debate about best strategies, it is encouraging that some of these species are being re-established. Malmgren & Haggar suggest *Spiranthes aestivalis* as another future target and it would be interesting to hear those opposing such a project explain their reasons. Hopefully, the combination of articles in this issue of *JHOS* indicates the level of interest and concern about the UK orchid flora and will encourage a future contribution from those who make the key decisions.

Thanks to Richard Bateman and Ian Taylor for their helpful comments.

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