

The cover features a photograph of a rocky, mountainous landscape. In the foreground, several tall, green-stemmed orchids with clusters of bright yellow flowers are in bloom. The flowers have a distinct reddish-brown spot on their lower petals. The background shows rolling hills and a large, snow-capped mountain peak under a clear blue sky. The text is overlaid on the top and bottom of the image.

*Journal*  
of the  
**HARDY ORCHID SOCIETY**

**Vol. 11 No. 1 (71) January 2014**

## 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](http://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.

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### Cover Photographs

**Front Cover:** Photograph of *Dactylorhiza sambucina* in Italy by Tony Hughes that was placed second in Class 7 of the 2013 Photographic Show.

**Back Cover:** Hilary Pickersgill's photograph of *Anacamptis coriophora* ssp. *fragrans* in Cyprus that came first in Class 8 of the 2013 Photographic Show and also won her the Maren Talbot Photographic Trophy for best photograph in the show.

### Contents

Editorial Note .....	3
Chairman's Note by Celia Wright .....	4
HOS Meeting Programme 2014 .....	5
Field Trips 2014 by Malcolm Brownsword .....	5
Results of Photographic Competition 2013 .....	7
<i>Platanthera</i> × <i>hybrida</i> discovery in Mid Wales by Mike Waller .....	12
The Moth Pollinators of Greater Butterfly Orchids <i>Platanthera chlorantha</i> in Central Scotland by Roy Sexton .....	14
Chlorophyll deficient <i>Epipactis helleborine</i> by John Spencer .....	24
Orchids of the Dolomites by Yiannis Christofides .....	26
A Sunny Morning in Kent – July 2013 by Rosemary Webb .....	32
More on Books about British Orchids by John Sumpter .....	34

### Editorial Note

This first *JHOS* of 2014 has a variety of articles, as well as results of the Photographic Competition and news of a vibrant field trip programme for the forthcoming orchid season. I am especially pleased to include Roy Sexton's description of his work on moths and pollination in the Greater Butterfly Orchid. As well as its inherent interest, it is a great example of engaging people in orchid studies and, importantly, extending involvement to children. Also, it is good to be able to include some interesting short articles from Mike Waller, John Spencer and Rosemary Webb. After a long gestation, I have made the updated website live but it still needs further work. Future plans include the addition of a password protected members' area with .pdf versions of *JHOS* and a rework of the orchid species image galleries. The latter will demand some additional photographs and offers are welcome with the initial focus on *Orchis* species. Also, do let me know of any errors or bad links.

### Chairman's Note Celia Wright

I'm writing this as winter arrives, prompting me to reflect that we've had a remarkably good year for hardy orchids, even if the long cold spring did hold plants back for a while. The Society has also had a good year with well attended meetings, field trips and seed sowing workshop, the last now becoming a popular annual event.

It has been good to see members volunteering for roles within the Society. Experience is important and comforting, but new blood keeps an organisation vibrant and helps us move forward. Next year we will welcome new faces organising field trips (Alan Bousfield), the Photographic Competition (Steve & Hilary Pickersgill with Neil Evans for projected images) as well as John & Shelagh Temporal at Leeds. There was a good set of entries for the Photographic Competition this year. You can see some of the winning entries in the Journal and more on our website. I'd like to thank Christine Hughes and Ann Kitchen, our outgoing organisers, for making it run so smoothly.

I would like to be able to tell you that we have volunteers for the Chairman and Vice-Chairman roles, but I can't. The members who are going to offer to do this have not yet come forward. I will be relinquishing the role of Chairman at the 2014 AGM, but if whoever steps into this role would like my support on committee, I will gladly offer to fill the Vice Chairman role for their first year in post. We also decided in committee that we would create a separate role of Programme Organiser, responsible for organising speakers for our 3 meetings each year in order to reduce the load on the new Chairman. If you would consider offering to do this, or be Chairman or Vice Chairman, please get in touch with me to talk about it. A volunteer is also needed as Journal Distributor from the 2014 AGM when Iain Wright will be standing down.

With the October 2013 Journal, you all received a letter from Moira Tarrant, our Membership Secretary, asking those who pay their subscriptions by Standing Order to cancel their old one and set up a new one to reflect the increase in subscription rates from May 2014. A disappointingly small number of members have done this so far, so there's another letter from Moira with this Journal with a Standing Order Mandate and a note of the new subscription rates. If you've lost both her letters, copies can be downloaded from the website. **Please write your new Standing Order Mandate NOW – only you can do it!** We could only change the amount for you if we went over to using a Direct Debit system. This would be expensive and we know would be unwelcome to some members. Help us to avoid any unnecessary overheads in order to keep subscriptions as low as we can for you.

So help HOS to thrive and enjoy all our Society offers its members, as I do. My very best wishes to you all for a happy New Year.

### **HOS Meeting Programme 2014**

**Sunday 30<sup>th</sup> March:** Spring Meeting, Plant Show & AGM at Kidlington

**Saturday 6<sup>th</sup> September:** Northern Meeting at St. Chad's, Leeds

**Sunday 16<sup>th</sup> November:** Southern Meeting & Photographic Show at Kidlington

## Field Trips 2014 Malcolm Brownsword

The 2014 programme of field meetings commences on Monday 5<sup>th</sup> May with a visit to Kent. Basic details of the meetings can be seen below. As always, only HOS members are eligible to attend. Numbers are limited to a maximum of 15 unless otherwise stated. Membership numbers should 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 earlier 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 organisations such as county Wildlife Trusts allowing access to their property. **It is important that orchids and orchid sites are not damaged by HOS members. Please take extra care when photographing orchids and other plants.**

For full details, and to book a place, please 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. There is usually a great demand for places, so to avoid disappointment, please book early. Contact [malcolm.brownsword@tesco.net](mailto:malcolm.brownsword@tesco.net) if you have a general query, and particularly if you are willing to lead a field trip in the future. This is my last compilation of field meetings before retiring from the committee in April 2014. In the meantime I will forward any offers for leading future meetings to my successor.

**Monday 5 May: Kent** for a May Day bank holiday visit to Samphire Hoe to see Early Spider-orchids and possibly Lady Orchids.

Contact Mike Parsons [mikeparsons30@talktalk.net](mailto:mikeparsons30@talktalk.net)

**Sunday 18 May: The Derbyshire Dales** to see vast numbers of Early-purple Orchids, with a few of the white and pink forms, in spectacular limestone scenery. Also other interesting plants and general wildlife.

Contact Cathryn Frost [cathryn.frost@w3z.co.uk](mailto:cathryn.frost@w3z.co.uk)

**Monday 26 May: Folkestone, Kent** for a spring bank holiday visit to see Late Spider-orchids & other orchids. Contact Mike Parsons [mikeparsons30@talktalk.net](mailto:mikeparsons30@talktalk.net)

**Thursday 29 May: Kent** with visits to two sites for *Orchis simia* and *Orchis purpurea*. Other species that could be seen include *Plantanthera chlorantha*, *Ophrys insectifera*, *Dactylorhiza fuchsii*, *Neottia nidus-avis*, *Neottia ovata*, *Cephalanthera damasonium* and of non-orchid interest, Duke of Burgundy butterflies.

Contact Alan Blackman [alanophrys@aol.com](mailto:alanophrys@aol.com)

**Saturday 30 May: North Downs** for a visit to Box Hill and Brockham Quarry led by Gillian and Ken Elsom. Expect to see Man, Bird's-nest, Fly, Greater Butterfly and

Common-spotted Orchids, as well as White Helleborine and Common Twayblade. The planned route is strenuous and includes steep hill sections.

Contact Gillian Elsom [gilliansom@live.co.uk](mailto:gilliansom@live.co.uk)

**Thursday 5 June: Oxfordshire** for a private site in south Oxfordshire and a chance to see *Ophrys apifera* var. *belgarum*. Contact Bill Temple [bill@billtemple.f9.co.uk](mailto:bill@billtemple.f9.co.uk)

**Saturday 7 June: Chafford Hundred, Essex** to see Man Orchid and perhaps seven other species of orchid. Contact Mike Parsons [mikeparsons30@talktalk.net](mailto:mikeparsons30@talktalk.net)

**Saturday 21 June:** Bedfordshire to visit four sites, hopefully for *Dactylorhiza praetermissa* and *D. fuchsii* plus hybrids, *Gymnadenia conopsea*, *Anacamptis pyramidalis*, *Cephalanthera damasonium*, *Ophrys apifera* and *Neotinea ustulata*. Contact Geraldine and Richard Hogg [geraldine\\_dick@hoggie49.plus.com](mailto:geraldine_dick@hoggie49.plus.com)

**Sunday 29 June: Noar Hill, Hampshire** with Nigel Johnson and Rosemary Webb at this diverse Hampshire and the Isle of Wight Wildlife Trust reserve. Amongst others, expect to see Musk Orchid, Twayblade, Pyramidal Orchid, Common Spotted-orchid and Chalk Fragrant-orchid, including white forms as well as many species of butterfly. Contact Nigel Johnson [cassandene@waitrose.com](mailto:cassandene@waitrose.com)

**Sunday 6 July: North Hampshire** for a visit to Ladle Hill and Watership Down to see *Neotinea ustulata* var. *aestivalis*, *Anacamptis pyramidalis* and *Dactylorhiza viridis* as well as other interesting flora and butterflies.

Contact Malcolm Brownsword [malcolm.brownsword@tesco.net](mailto:malcolm.brownsword@tesco.net)

**Sunday 13 July: Ainsdale Dunes, Sefton, Merseyside** for a visit to this extensive National Nature Reserve to see Dune, Green-flowered and Marsh Helleborines. Contact Alan Bousfield [alan.bousfield@ukgateway.net](mailto:alan.bousfield@ukgateway.net)

**Sunday 27 July: Perth and Kinross** for a field meeting in Scotland again led by Alan Bousfield for a second year. Expect to see Northern Marsh-orchid, Heath Spotted-orchid and their hybrids, Early Marsh-orchid (subsp. *pulchella*), Heath Fragrant-orchid, Common Twayblade, Small-white Orchid, Greater Butterfly-orchid and Bird's-nest Orchid. Alan has been asked if possible to include Lesser Twayblade and Coralroot Orchid to the above list from last year, so this should prove to be an interesting day. Numbers attending are likely to be limited to ten.

Contact [alan.bousfield@ukgateway.net](mailto:alan.bousfield@ukgateway.net)

**Sunday 27 July: Buckinghamshire** for a visit to the High Wycombe area to look for Violet Helleborine, including *rosea* and variegated forms. Wasps are frequently seen pollinating the flowers in this area. The sites are at the side of country roads where the traffic is often fast so numbers are limited to ten members.

Contact Hilary Pickersgill [hilaryp52@btinternet.com](mailto:hilaryp52@btinternet.com)

**Saturday 30 August: The New Forest, Hampshire** for a field visit to see Autumn Lady's-tresses, Marsh Gentian and other interesting flora, as well as dragonflies. Contact David Hughes. [davidcchughes@talktalk.net](mailto:davidcchughes@talktalk.net)

Although he is not leading an official field meeting to Holy Island in 2014, Colin Scrutton [Colin.Scrutton@dunelm.org.uk](mailto:Colin.Scrutton@dunelm.org.uk) has offered to guide anyone interested (including some who missed out in July 2013) to the appropriate localities.

## Results of Photographic Competition 2013

**Class 1. A wide area view (landscape or habitat) showing orchids in their natural environment, print size up to 7x5 inches (13 entries)**

1<sup>st</sup> Tom Turner – Bird’s nest Orchid (*Neottia nidus-avis*)

2<sup>nd</sup> Ruth Brown – Early-purple Orchid (*Orchis mascula*)

3<sup>rd</sup> Tony Hughes – Green-winged Orchid (*Anacamptis morio*)

**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 (20 entries)**

1<sup>st</sup> David Pearce – Musk Orchid (*Herminium monorchis*) [Fig. 2-1]

2<sup>nd</sup> Karen Gregory – Coralroot Orchid (*Corallorhiza trifida*)

3<sup>rd</sup> Hilary Pickersgill – Hybrid *Orchis militaris* × *purpurea*

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

1<sup>st</sup> David Pearce – Early-purple Orchid (*Orchis mascula*) [Fig. 3-1]

2<sup>nd</sup> David Hughes – *Orchis pauciflora* [Fig. 3-2]

3<sup>rd</sup> Tom Turner – Man Orchid (*Orchis anthropophora*)

**Class 4. A close-up of an orchid, print size up to 7x5 inches (21 entries)**

1<sup>st</sup> Karen Gregory – Pyramidal Orchid (*Anacamptis pyramidalis*)

2<sup>nd</sup> Hilary Pickersgill – *Ophrys levantina*

3<sup>rd</sup> David Hughes – Early Spider-orchid (*Ophrys sphegodes*)

**Class 5. A wide area view (landscape or habitat) showing orchids in their natural environment, print size up to A4 (12 entries)**

1<sup>st</sup> Tom Turner – Early-purple Orchid (*Orchis mascula*)

2<sup>nd</sup> Hilary Pickersgill – Military Orchid (*Orchis militaris*)

3<sup>rd</sup> Tony Hughes – *Dactylorhiza sambucina*

**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 (19 entries)**

1<sup>st</sup> Hilary Pickersgill – Early-purple Orchid (*Orchis mascula*)

2<sup>nd</sup> Nigel Johnson – Common Twayblade (*Neottia ovata*)

3<sup>rd</sup> Barry Taylor – Southern Marsh-orchid (*Dactylorhiza praetermissa*)

**Class 7. A single orchid plant, usually the single stem arising from one tuber, print size up to A4 (see Rule 9) (21 entries)**

1<sup>st</sup> Nigel Johnson – Autumn Lady’s-tresses (*Spiranthes spiralis*)

2<sup>nd</sup> Tony Hughes – *Dactylorhiza sambucina* [Front Cover]

3<sup>rd</sup> Ken Elsom – Bird’s nest Orchid (*Neottia nidus-avis*)

**Class 8. A close-up of an orchid, print size up to A4 (21 entries)**

1<sup>st</sup> Hilary Pickersgill – *Anacamptis coriophora* ssp. *fragrans*\* [Back Cover]

2<sup>nd</sup> Gillian Elsom – Narrow-lipped Helleborine (*Epipactis leptochila*) [Fig. 8-2]

3<sup>rd</sup> Karen Gregory – Heath Spotted-orchid (*Dactylorhiza maculata*)

**Class 9. A wide area view (landscape or habitat) showing orchids in their natural environment, maximum size 1400 pixels wide and 1050 pixels high (17 entries)**

- 1<sup>st</sup> Karen Gregory – *Serapias cordigera* [Fig. 9-1]
- 2<sup>nd</sup> Ken Elsom – Narrow-lipped Helleborine (*Epipactis leptochila*)
- 3<sup>rd</sup> Phil Smith – *Orchis italica*

**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 (21 entries)**

- 1<sup>st</sup> Ken Elsom – Narrow-lipped Helleborine (*Epipactis leptochila*) [Fig. 10-1]
- 2<sup>nd</sup> Tony Hughes – *Orchis pauciflora* [Fig. 10-2]
- 3<sup>rd</sup> Nigel Johnson – Bog Orchid (*Hammarbya paludosa*)

**Class 11. A single orchid plant, usually the single stem arising from one tuber, maximum size 1400 pixels wide and 1050 pixels high (21 entries)**

- 1<sup>st</sup> Tony Hughes – Lady Orchid (*Orchis purpurea*)\*\* [Fig. 11-1]
- 2<sup>nd</sup> Sean Cole – Bog Orchid (*Hammarbya paludosa*) [Fig. 11-2]
- 3<sup>rd</sup> Colin Scrutton – Red Helleborine (*Cephalanthera rubra*)

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

- 1<sup>st</sup> Steve Pickersgill – *Serapias bergonii* [Fig. 12-1]
- 2<sup>nd</sup> Alan Pearson – *Ophrys scolopax* [Fig. 12-2]
- 3<sup>rd</sup> Colin Rainbow – *Serapias vomeracea*

**Class 13. Novice Class, any hardy orchid print, size up to A4 (10 entries)**

- 1<sup>st</sup> Ken Elsom – Burnt Orchid (*Neotinia ustulata*) [Fig. 13-1]
- 2<sup>nd</sup> Steve Pickersgill – Pyramidal Orchid (*Anacamptis pyramidalis*)
- 3<sup>rd</sup> Ruth Brown – Bird's nest Orchid (*Neottia nidus-avis*)

**Class 14. A hardy orchid subject that has been manipulated creatively using any advanced software technique to create an artistic image. Print maximum size A4.**

- 1<sup>st</sup> Alan Blackman – Marsh Helleborine (*Epipactis palustris*)
- 2<sup>nd</sup> Gillian Elsom – Pyramidal Orchid (*Anacamptis pyramidalis*) with moth
- 3<sup>rd</sup> David Pearce – Fly Orchid (*Ophrys insectifera*)

**Maren Talbot Photographic Trophy:** Hilary Pickersgill for her print in Class 8\*

**Best Projected Image:** Tony Hughes for his photograph in Class 11\*\*

**Our Thanks to the Competition Judge:** Peter Brandham

The following three pages display some of the winning images from the 2013 HOS Photographic Show. Figure numbers indicate the Class followed by the position achieved (e.g. 11-2 is the second place winner in Class 11). In the results list above, winning entries displayed in this issue are indicated by a figure number in brackets. More pictures will appear in the next *JHOS* and all are now available on the website at [www.hardyorchidsociety.org.uk](http://www.hardyorchidsociety.org.uk).







11-2



12-2



8-2



12-1



## *Platanthera* × *hybrida* discovery in Mid Wales

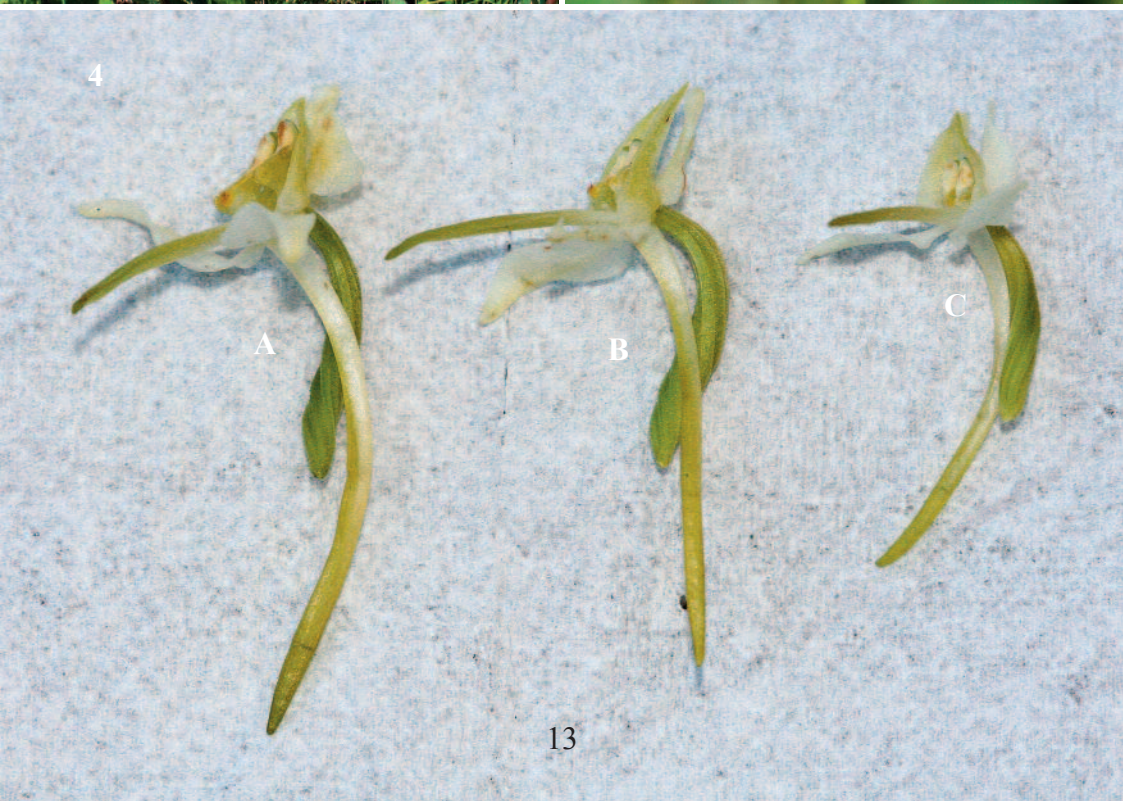
Mike Waller

In early July this year, I visited Cae Blaen-dyffryn nature reserve just outside Lampeter on the Ceredigion-Carmarthenshire border in Mid Wales. My visit was simply to photograph the extensive populations of both *Platanthera chlorantha* and *Platanthera bifolia*, which grow side by side and anything else of interest that I might find in the large hay meadow of which the reserve consists. I had visited the previous year albeit too late for the butterfly orchids so decided I would make a better effort to see plants in good condition. A few days previously, I had been advised by the county recorder for Ceredigion, Mr. Arthur Chater, to keep an eye out for *P. ×hybrida* with its typically intermediate morphological characteristics, mid-way between each parent. After an hour or so of enjoying hundreds of butterfly orchids and *Dactylorhiza maculata*, I came across a single butterfly orchid that appeared to be perfectly intermediate. The pollinia shape, size and position are of course the most useful identification features between our two butterfly orchids but in the case of this plant, the pollinia looked neither widely spaced apart as in *P. chlorantha*, nor closely paired in a parallel position as in *P. bifolia*. When I left, I collected a single floret from the suspect hybrid and the nearest *P. chlorantha* and *P. bifolia*, which I photographed side by side for further comparison. It is interesting to note that the labellum of the hybrid was considerably longer than either of the other two florets collected.

Figs. 1 & 4: Single florets from *P. chlorantha* (A), the hybrid (B) & *P. bifolia*(C)  
Figs 2 & 3: *P. ×hybrida* at Cae Blaen-dyffryn nature reserve

Photos by Mike Waller





## The Moth Pollinators of Greater Butterfly Orchids *Platanthera chlorantha* in Central Scotland Roy Sexton

With essential help from the following moth recorders: Stuart Bence, Claire Bird, Lorna Blackmore, Tim Brain, Michael Christie, Jennifer Davidson, Bob Dawson, John Knowler, Barbara Macritchie, John Oates, Tony Rogers, Melissa Shaw.

In his book '*The Various Contrivances by which Orchids are Fertilised by Insects*' Charles Darwin (1862; 1877) speculated that the Greater Butterfly Orchid (GBO) was pollinated by large night-flying moths. He based his proposal on the following observations: i) the flowers were white and so would show up at night ii) the floral scent to attract pollinators was produced nocturnally iii) the sugary nectar to reward insect visitors was found at the end of a 26mm long conical nectary or spur. This could only be reached by insects with long tongues like butterflies or moths.



Figure 1  
Greater Butterfly Orchid  
Photo by Roy Sexton

Careful examination of the structure of the flowers led Darwin to propose that when moths drank nectar the club-shaped masses of pollen positioned either side of the spur entrance became glued to their large compound eyes. He speculated that the pollen mass was repositioned as it dried and twisted so that it was deposited on the stigmas of the flowers which the moth visited subsequently. Naturalists soon caught moths with GBO pollen on their eyes consistent with this hypothesis, but it was the meticulous studies of Anders Nilsson (1978) a century later that provided detailed scientific support. It is his Swedish observations that I have attempted to confirm on Scottish plants.

The GBO flower spike is composed of 10-30 greenish white flowers (Figure 1) each of which is said to resemble a tiny angel with wings outstretched (Figure 2). The two sepals that form the wings provide 'handle bars' for the visiting moths to grab with their front legs. The third upper sepal together with two

of the petals form a white ‘hood’ over the ‘column’. This is a structure in the centre of the flower which bears the two separated diverging anther sacs with the stigma located between them. The lower petal is elongated into a tapering lip or labellum which acts as a ‘landing platform’ for the moth’s body. In the centre of the flower the lip is formed into a long thin (1-2mm diameter) greenish white tubular nectary or spur, which extends some 25-30 mm in a gentle curve behind each flower (Figure 3). The sugary nectar solution that serves as a reward for pollinators is visible through its translucent wall.

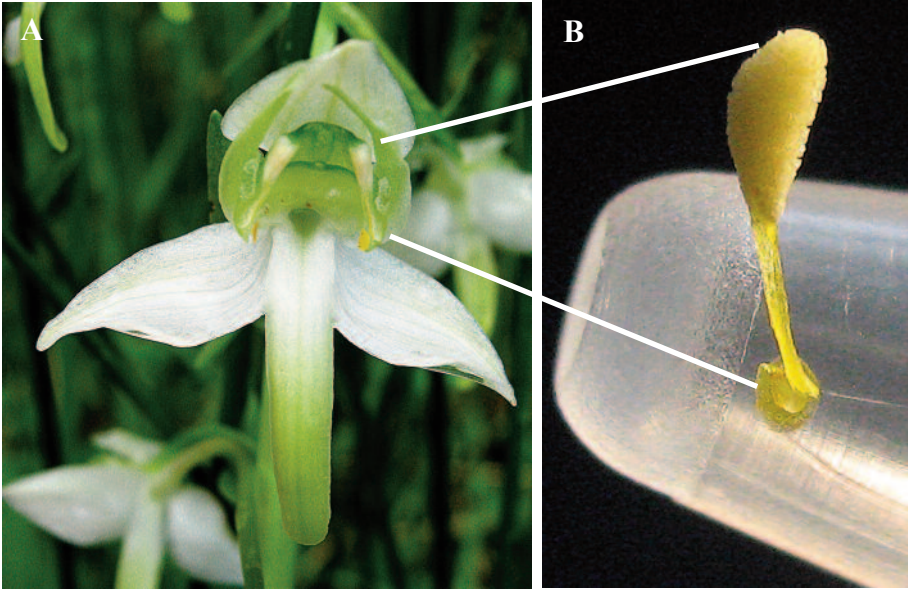


Figure 2 (A) a floret with the entrance to the spur visible in the centre of the flower. The sticky surface above the opening is the stigma with the two anther sacs appearing as slanting columns on either side. The club-shaped pollinium (B) was removed from the anther sac by inserting the piece of plastic rod the diameter of a moth’s head into the mouth of the spur. The adhesive disc or viscidium on the tip of one pollinium adhered to the plastic (just as they would to a moth’s eye) and as the rod was withdrawn from the flower the pollinium was pulled out from its sac through a longitudinal slit in the wall.

Photos by Roy Sexton

Like the majority of our native orchids, the individual pollen grains (approx. 150,000 per sac) are cemented together into two club-shaped structures known as pollinia. The pollinia are contained in two anther sacs that are slit down their length so a visiting insect can easily remove them. These sacs form two sides of an arch

that stands in front of and over the stigma. The narrow basal ends of the pollinia are attached to two tiny drum-shaped structures mounted on sticky circular yellow discs or viscidia (Figure 2). The flat surfaces of the viscidia face towards each other and will cement the pollinia onto the sides of a visiting moth's head. The stigma, where pollen has to be applied to induce fertilization, are located in the centre of the flower above the entrance to the spur (Figure 2). Behind them is found the ovary containing approximately 6200 ovules. To form a seed, each ovule needs to be fertilised by a pollen tube growing from a single pollen grain deposited on the stigma.



Figure 3  
A side view of the fleret showing the 28mm long spur into which the moth will insert its proboscis. The surface of the nectar can be seen 11mm from the tip (arrow).

Photo by Roy Sexton

It has been proposed that moths are guided to the inflorescence by its powerful scent and once within close visual range they grasp a flower and insert their long tongue or proboscis into the tubular spur to suck out the nutritious nectar. As the nectar is removed the moth will probe deeper into the spur until its head comes into contact with the sticky discs on the pollinia bases. Darwin realised that the viscidia would not attach to most surfaces on the moth because they are covered in readily detached scales. He deduced that they were positioned so that they would come into contact with one of the only naked structures on the moth's body, its large compound eyes. The pollen masses, once glued to the side of the moth's head, would be pulled from their anther sacs as it backs out of the flower. The moth would subsequently carry them to the next GBO flower where the constituent pollen grains would stick to the tacky stigma, fertilizing the flower and eventually inducing the formation of seed. Often it is not only pollen that is left behind on the stigma but tufts of moth's head scales as well.

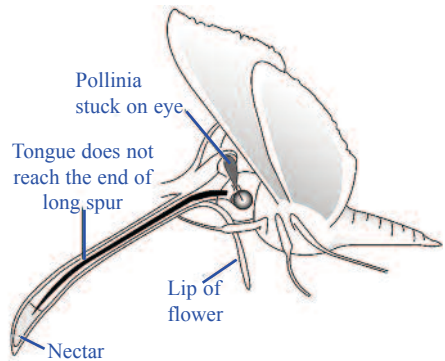


Figure 4  
A moth nectaring on a GBO flower.  
Redrawn from Nilsson (1978)



Darwin recognized that the pollinating moth's proboscis needed to be long enough to reach the surface of the nectar but not so long that the moth would drain the spur without its head coming into contact with the pollinia ( Figure 4). Over the last six years I have measured the lengths of 720 spurs from local Central Scottish GBO populations. The mean length of the spurs of all the flowers (including those at the apex) was 25.7 mm. On average each spur contained a 10.1mm length of nectar so the mean distance from spur mouth to nectar was 15.6 mm. However, although the amount of nectar is surprisingly constant it does vary and occasionally spurs are encountered that are more than two thirds full as well as some that are practically empty. Figure 5 is constructed from these data and shows how frequently a moth with a particular proboscis length will be rewarded by being able to reach the nectar. For instance the most common local pollinator, the Gold Spangle moth, has a proboscis 19mm in length and from the graph it is apparent that it will reach the nectar on nearly 75% (or three out of four) of its visits.

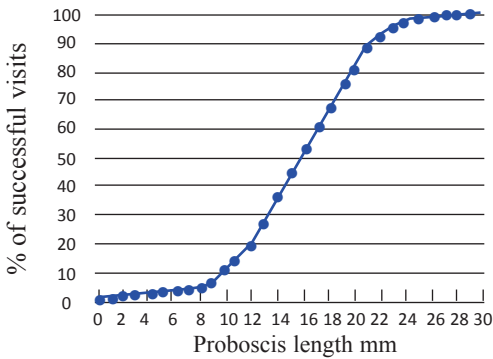


Figure 5

A plot showing the relationship between the proboscis lengths of moths and percentage of visits where they can successfully reach the nectar surface in the spur.

Over the last five years with the help of a loyal gang of ‘moffers’ we have set up Robinson UV light traps in a number of GBO meadows near Stirling in the hope of catching moths that have pollinia on their eyes (Figure 7). I quickly learned that moths are pretty fussy about when they fly; it seems that most evenings are too cold, too wet, too windy, too clear or too moonlit for them to bother. The flowering period during the last week in June and first week in July is hardly ideal either. In Scotland it doesn't get dark until at least 11.30 pm and dawn will start to break about 2.5 hours later so there is a relatively short period in which to get all this pollinating done. Although we have only once failed to catch a moth with pollinia on its eyes we have never caught more than 15 in one evening. Since some meadows we visit can have upwards of 5,000 individual flowers to be pollinated one cannot help but question how widespread moth mediated cross pollination can be.

Most of the moths that seem to be involved in pollination are Noctuids that are quite as beautiful as the orchids they visit (Table 1; Figure 8). The sub-group known as the Plusiinae are particularly regal having gold and silver refractive patches on their wings. Their names reflect their gilding such as Silver Ys, Gold Spangles and Burnished Brass (Figure 8). We have found that most of our Scottish GBO pollinators are the same as those recorded in Sweden by Nilsson (1978) though there are a few new-comers to add to Claessens & Kleynen's (2011) recent list.



Figure 6

Stirling Countryside Ranger Service's family moth trapping and camping event at Plean Country Park GBO meadow.

Photo by Roy Sexton

When caught, most of the moths only have one or two pollinia on their eyes but we have found as many as 11 on one poor individual. Although this must partially blind them it may not be as bad as it seems since they may well rely on smell for guidance rather than sight. Moths have been shown to be able to find and probe the nectaries of scented flowers in complete darkness. Partially blinding the moth might work to the advantage of the strongly scented GBOs by reducing the chance the moths carrying their precious pollen loads to alternative flowers more dependent on visual attractants. The aroma of the flowers is made up of a cocktail of different volatile chemicals. The GBO's rich heavy scent is hard to describe but I

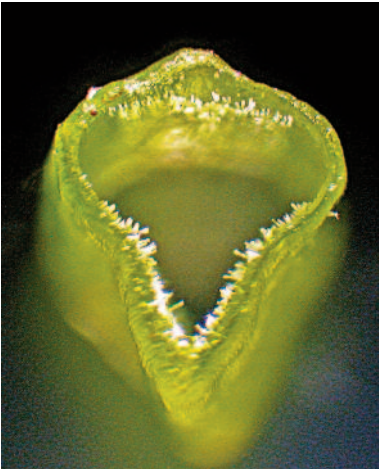
recall a young lady suggested that it reminded her of her granny's perfume. If her granny suffered from rheumatism or arthritis this might well have been the case since one of the components is methyl salicylate, a constituent of deep heat creams. It is thought that some of these volatiles like methyl benzoate may serve a dual function, not only attracting pollinators but repelling some herbivores, though sadly not deer. Preliminary work with a chemist colleague Dr Ewan McQueen (Sexton & McQueen, 2004) suggested that the aroma signatures of different petals were distinct and so it might well be possible for the moths to orientate themselves on the flower using chemical sensors in their feet. Most of the GBO pollinators fly only at dusk or after dark and I have only once seen a Silver Y moth pollinate an inflorescence in daylight. It seemed to fly straight to the flower at some speed, then after a whirling of wings for about 15 secs it moved complete with pollinia to another flower on the same inflorescence. It had obviously not read Mr Darwin's book since this would result in undesirable self-fertilization. However eventually it obviously recalled the important advantages of cross pollination and made off to another plant.

The proportion of a given moth species that have attached pollinia is very variable. One evening, 14 of the 17 Gold Spangles we caught had them. On the other hand, of the hundreds of Large Yellow Underwings we have trapped only three have ever sported pollinia. It is important to realize that there are many other species in these meadows that never show any signs of visiting GBOs. All the moths in Table 1 were caught in Central Scotland but after being asked to talk to a Butterfly Conservation's moth recorders conference I have been sent records from outside my area. These suggest that different regions may well have different pollinators: for instance, the only two Marbled Coronet (*Hadena confusa*) records both came from West Coast meadows at the Kyle of Lochalsh and Treshnish on Mull.

Common Name	Latin Name	Number Caught	Proboscis Length mm
Gold Spangle	<i>Autographa bractea</i>	27	19-20
Beautiful Golden Y	<i>Autographa pulchrina</i>	7	16-18
Large Yellow Underwing	<i>Noctua pronuba</i>	3	13-15
Lempke's Gold Spot	<i>Plusia putnami gracilis</i>	2	-
Silver Y	<i>Autographa gamma</i>	2	15-16
Gold Spot	<i>Plusia festucae</i>	1	13-14
Plain Golden Y	<i>Autographa jota</i>	1	-
Spectacle	<i>Abrostola tripartita</i>	1	12-13
Burnished Brass	<i>Diachrysia chrysitis</i>	1	15-16
Small Elephant Hawkmoth	<i>Deilephila porcellus</i>	1	21
Straw Dot	<i>Rivula sericealis</i>	1	5

Table 1  
Moths trapped in Central Scotland with GBO pollinia attached to their eyes.  
The number caught with their approximate proboscis length is shown.

Accurately determining the lengths of moth's coiled tongues is not easy unless you can bring yourself to kill a sample of each species. What I am trying to excuse is rather statistically unreliable data in Table 1. Fortunately the values are very similar to those in Nilsson's more robust Swedish results (Nilsson 1978). Comparison of the tongue lengths with the frequency graph shows that the commonest pollinators, the Gold Spangle and Beautiful Golden Y, will get a 'wee swally' of nectar at about two out of three flowers they visit. Those like the Gold Spot and Spectacle will only strike lucky once in every 5 visits and the poor wee Straw Dot will never succeed at all. It has been suggested that moths with short tongues that cannot reach the surface of the nectar are able suck up the liquid trapped by capillarity in the short hairs lining the lower V-shaped side of the spur (Figure 7). My observations suggest that the hairs do not extend up the spur far enough to help the Straw Dot but may keep the moths with intermediate length tongues interested.



Darwin demonstrated that directly after the pollinium was withdrawn from the anther sac the 3.75mm long shaft of the structure pivoted round 'like the hand on a clock' on the affixed drum at its base. This movement is not a simple arc but takes the head of the pollinium from above the eye down and across so that it is finally positioned in front of the head (see Fig 8B). In this position it will be pushed against the stigma when the moth feeds in its next flower. This movement is supposed to be completed in the time it takes the moth to move from one flower to another. Observed under the microscope it took on average 1min 56sec, very similar to values in Claessens & Kleynen (2011).

Figure 7 (above)  
Cross section of the spur showing the short hairs

Figure 8 (opposite)  
Examples of moths caught with pollinia on their eyes: A) A Silver Y carrying five pollinia; B) A close up of A showing how the pollinia have moved so their tips are located in front of the moth's head where they will strike the stigma; C) A Gold Spangle with 11 pollinia; D) A Burnished Brass; E) A Gold Spot; F) A Straw Dot with only a 5mm proboscis, definitely not the sort of moth pollinator Darwin envisaged.

Photos by Roy Sexton

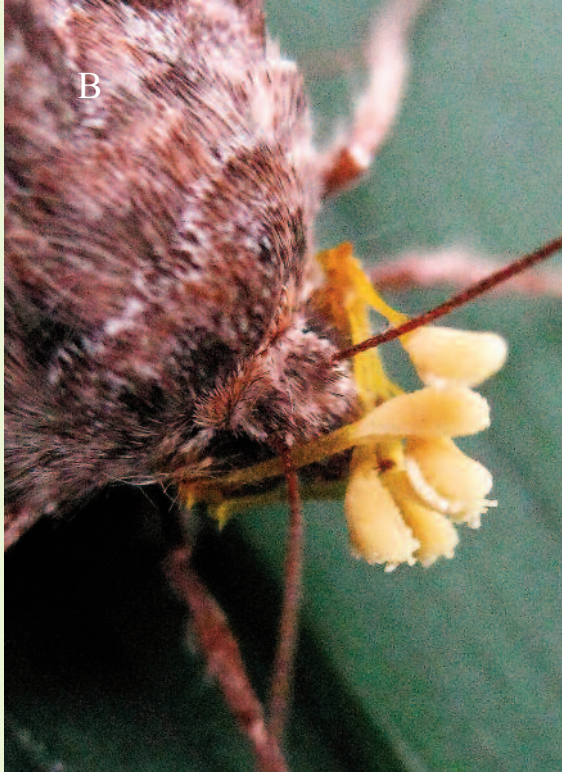




Figure 9

The project has been successful in engaging young people. Here Abby, with her eyes closed, investigates if, like a moth, she can locate a GBO flower using its scent alone.

Photo by Roy Sexton

The question arises as to just how successful this mechanism is. Like Darwin I have found that a high proportion of pollinia are removed from their anther sacs, implying lots of moths are at work. However, he also discovered that if you shook a bunch of flowers the pollinia were ejected from their sacs suggesting that lashing winds might contribute to pollinium loss. Counting the proportion of stigmas that have pollen on them probably provides a more reliable assessment. In 2004 I found that 30% of florets had pollen on their stigmas whereas in 2008 this was true of only 17% of the flowers. In contrast, counts of the ovaries that had become swollen with seed varied from 43-64% at different sites, similar values to those reported in Claessens & Kleynen (2011) but far more than would be anticipated from the pollination frequency.

After ten years observation I am left with a feeling of unease that all this fertilisation is attributed solely to moths – there just do not seem to be enough of them active in the field. Nilsson (1978) who caught similar numbers per night describes the moths as

abundant so perhaps I am being unduly pessimistic. However these misgivings are as nothing compared with a parallel study of Lesser Butterfly Orchids (*Platanthera bifolia*) where after 3 years I have only trapped one pollinator, but that's another story.

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## Chlorophyll deficient *Epipactis helleborine*

John Spencer

Lower Woods in South Gloucestershire is a 700 acre / 284 hectare block of mixed oak and ash woodland. The heavy clay soil in the Severn Vale has deterred would-be farmers and preserved the trees. Both *Epipactis helleborine* and *Epipactis purpurata* grow here and the pink “*rosea*” form of *E. purpurata* has been recorded since the 1950s. In August 2013, Alan Smith discovered an *Epipactis helleborine* completely lacking chlorophyll, perhaps as the result of unusual activity by its fungal partner. This “*albifolia*” form in *E. helleborine* is much rarer than the *rosea* equivalent in *E. purpurata* and was a first record for Lower Woods.

With *E. purpurata* var. *rosea* the leaves are pink because, although chlorophyll is absent, anthocyanins are still present. With *E. helleborine* var. *albifolia* the leaves are white because anthocyanins are only present in the flowers and, to a lesser extent, the stem. The whole plant photograph of *E. helleborine* var. *albifolia* (Fig. 2) was taken using a very long exposure so as to accentuate the pale, chlorophyll-deficient leaves.



Chlorophyll-deficient variants of *Epipactis*

Figs. 1 & 4: *E. purpurata* var. *rosea*

Figs. 2 & 3: *E. helleborine* var. *albifolia*

Photos by John Spencer





## Orchids of the Dolomites

### Yiannis Christofides

The Dolomites are an incredible place, not only because of the dramatic landscape with towering peaks of dolomitic limestone and beautiful high altitude plants but also the most amazing wild flower meadows to be seen anywhere in the world. The shape of these mountains is unique, having risen out of the sea around 250 million years ago. Ice and wind modelled the rocks creating the steep walls, towering spires and pinnacles typical of these mountains, which have always been a source of wonder.

It is all these I was hoping to see on a recent visit. What I did not expect to see were the incredible displays of orchids amongst the other flowers and also the many other species found in the woodland habitats. I was based in Campitello in the Val di Fassa in the Italian Dolomites and the visit in late June was timed to coincide with the peak flowering season of the meadows and also with the first snow-melt flowers. The orchids were found mainly in two habitats, in flower meadows and in woodland.

#### The Woodland Orchids

The star of the show was *Cypripedium calceolus*, in several clumps found in exposed positions on the edge of woodland. It is the sole representative of the genus in Europe, widespread in temperate forests, but rare.

*Neottia nidus-avis*, the Bird's nest orchid, is saprophytic, occurs in clumps and is immediately recognisable from its pale brown colour and lack of chlorophyll. An orchid with a widespread distribution in Europe and Asia. A relatively common orchid in woodland.

Another saprophytic orchid is *Corallorhiza trifida* (Northern Coralroot). Several stems are usually found growing together and the flowers are tiny with four pollinia, pollinated by Hymenoptera and small flies. It is the only European representative of an otherwise American genus, widespread in boreal Europe, but more local in temperate areas. It is a relatively rare orchid in the area.

*Listera ovata* (Common Twayblade) is an entirely green orchid with two opposite leaves joined to the lower end of the stem. The green flowers produce an abundance of nectar and are visited by a variety of insects including flies, Coleoptera and Hymenoptera which no doubt contribute to pollination.

Fig. 1: *Cypripedium calceolus*

Fig. 2: *Neottia nidus-avis*

Fig. 3: *Corallorhiza trifida*

Photos by Yiannis Christofides



An almost green, similar looking orchid, is *Dactylorhiza viride* (Frog Orchid), previously thought to belong to the monospecific genus *Coeloglossum*. It takes its name from the depression at the base of the labellum. It is a circumboreal species, preferring open woodland and alpine meadows. This species also provides nectar and is pollinated by many insects.

*Chamorchis alpina* is a tiny orchid endemic to alpine meadows at high altitudes. It flowers a little later and was therefore not seen.

*Platanthera bifolia* (Lesser Butterfly Orchid) was another woodland orchid seen. It is an orchid with a Eurasian distribution, commoner in northern countries.

*Dactylorhiza fuchsii* (Common Spotted Orchid) was very common on the edge of woodland and was just beginning to flower. Two other *Dactylorhiza* species may be found in the area, *D. majalis* and *D. alpestris*.

*Ophrys insectifera* (Fly Orchid) is the only *Ophrys* species found in the area and only two specimens were seen. A middle European orchid, it is the most northern *Ophrys*, widespread but rare.

### **The Meadow Orchids**

These were often found in their hundreds, growing in flower meadows with other colourful plants. *Gymnadenia conopsea* (Fragrant Orchid) was the commonest orchid. It is a widely distributed Eurasian orchid with many variants found in different habitats. The plants found were slender with mostly pale flowers.

*Nigritella austriaca* (Austrian Vanilla Orchid) was a rarer orchid, wonderful to see in the meadows, a small orchid that could easily be overlooked. This local orchid is confined to the central and eastern Alps. It is a tetraploid apomictic species reproducing asexually and therefore not dependent on insect pollinators.

*Orchis ovalis*, replaces *O. mascula* (Early Purple Orchid) in central Europe, found as far south as central Italy, Corsica and the Balkans. A tall orchid, it reaches 60 cm high with relatively large flowers with long-pointed sepals and petals.

Fig. 4: *Listera ovata*  
Fig. 5: *Dactylorhiza fuchsii*  
Fig. 6: *Ophrys insectifera*  
Fig. 7: *Gymnadenia conopsea*  
Photos by Yiannis Christofides



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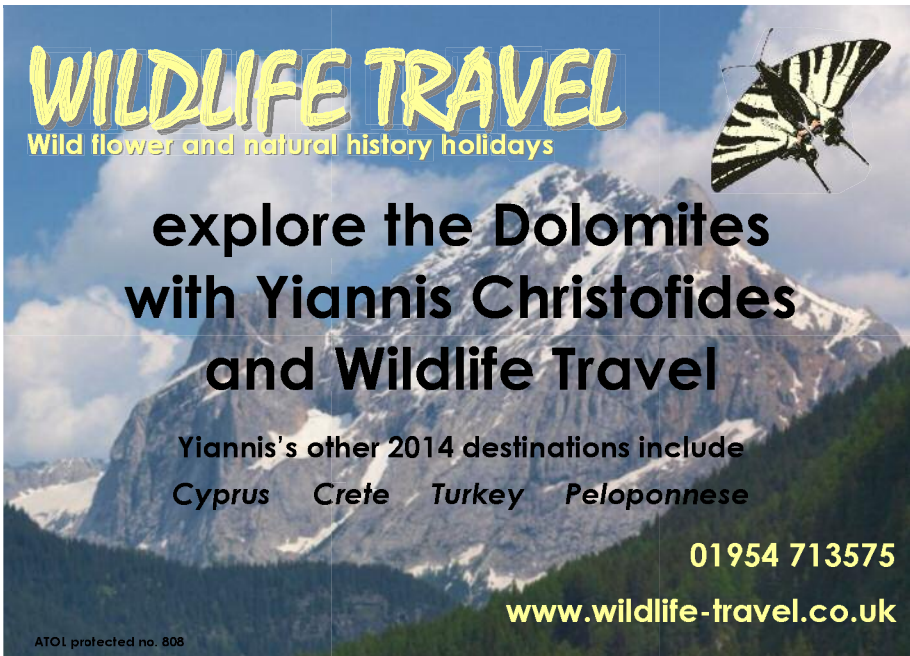
*Orchis militaris* (Military Orchid) has a widespread distribution in Eurasia but is relatively rare. Several specimens were found.

*Neotinea (Orchis) ustulata* (Burnt Orchid) was a rare, locally common species, found in one meadow, growing with hundreds of *Gymnadenia conopsea*.

*Orchis anthropophorum* (Man Orchid). A few specimens of this widespread European orchid were found.

*Traunsteinera globosa* is one of two species in the genus found in subalpine areas of the Dolomites, Pyrenees, Carpathians and the Balkans. Only a few individuals were found in one meadow, but perhaps overlooked because of their relatively small size.

Fig. 8: *Orchis ovalis*  
Fig. 9: *Orchis militaris*  
Fig. 10: *Orchis ustulata*  
Fig. 11: *Traunsteinera globosa*  
Photos by Yiannis Christofides



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## A Sunny Morning in Kent – July 2013

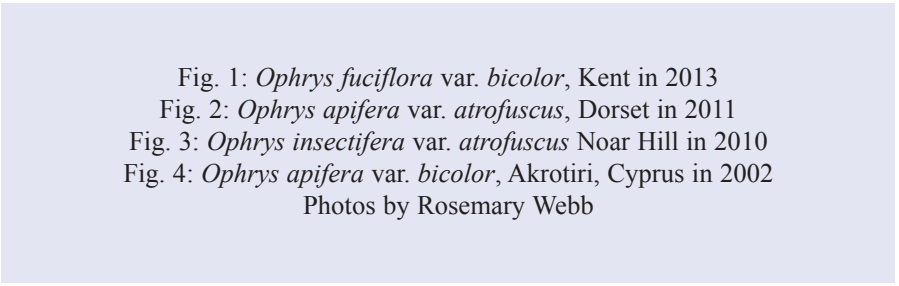
### Rosemary Webb

After a very unpromising start, 2013 developed into a summer to remember. The prolonged rain of 2012 and the exceptionally cold, late spring of 2013 seemed to suggest that we would have a poor orchid season. At the time when our first plants are normally coming into flower in the south of England, there was very little evidence that there would soon be any orchids. The late flowering season continued but once orchid flowers began to appear, it was obvious that this was going to be a good year.

In the first week of July, I was in Kent, specifically to look for the Late Spider Orchid, *Ophrys fuciflora*. I visited different sites on 5<sup>th</sup> & 6<sup>th</sup> July and found the plants in full flower. I had been apprehensive because I thought it was quite possible they would be over or past their best as the hot summer weather had begun.

There were plenty of flowering spikes at the sites that I visited but I was especially pleased to find one with unusual flowers. All *Ophrys* have a variety of labellum shapes and patterns and these make an interesting and attractive variation in a collection of photographs. My attention fixed on one plant. It was one of the shorter plants, quite sturdy, with only two flowers and it had no lip pattern at all. The whole lip was a bright, deep brownish-russet colour with the apical half darker than the basal part of the lip. The two tones of colour were not as distinctly different as var. *bicolor* in *Ophrys apifera* but were nevertheless obvious. There were small basal swellings and the ‘shoulders’ were a lighter ochre colour.

I have not seen an *Ophrys fuciflora* like this one pictured anywhere, so I set out to remedy this myself! I have seen the *atrofuscus* variant of *Ophrys apifera*, I have seen *Ophrys insectifera* with a blackish lip and no speculum and now, here was *Ophrys fuciflora* showing a similar variation. A very worthwhile and interesting trip to Kent and a photograph of a variation that I have never seen before, even in continental Europe.

- 
- Fig. 1: *Ophrys fuciflora* var. *bicolor*, Kent in 2013  
Fig. 2: *Ophrys apifera* var. *atrofuscus*, Dorset in 2011  
Fig. 3: *Ophrys insectifera* var. *atrofuscus* Noar Hill in 2010  
Fig. 4: *Ophrys apifera* var. *bicolor*, Akrotiri, Cyprus in 2002  
Photos by Rosemary Webb

## More on Books about British Orchids

### John Sumpter

I enjoyed the article by Keith Fry (*JHOS* 8: 136-143, 2011) a great deal. It was both unique and interesting. Like the author, I have collected books on British orchids, albeit not with the commitment he has obviously shown. Besides the books on the list in the article, I am aware of one further book on British orchids, which is:

Wallace, N. & Maggs, K. R. A. (1970) *Croydon Field Studies. No. 6: The Orchids Around Pilgrim Fort.*

This is a very slim book, and its apparent omission from Fry's list in no way detracts from that list, or the quality of his article. It would be interesting to know if anyone else is aware of any other apparent omissions. Since publication of Fry's article, at least one more book on our native orchids has been published. It is:

Creed, P. & Hudson, R. (2013) *A Guide to Finding Orchids in Buckinghamshire and Oxfordshire.* ISBN: 978 1 874357 57 5

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