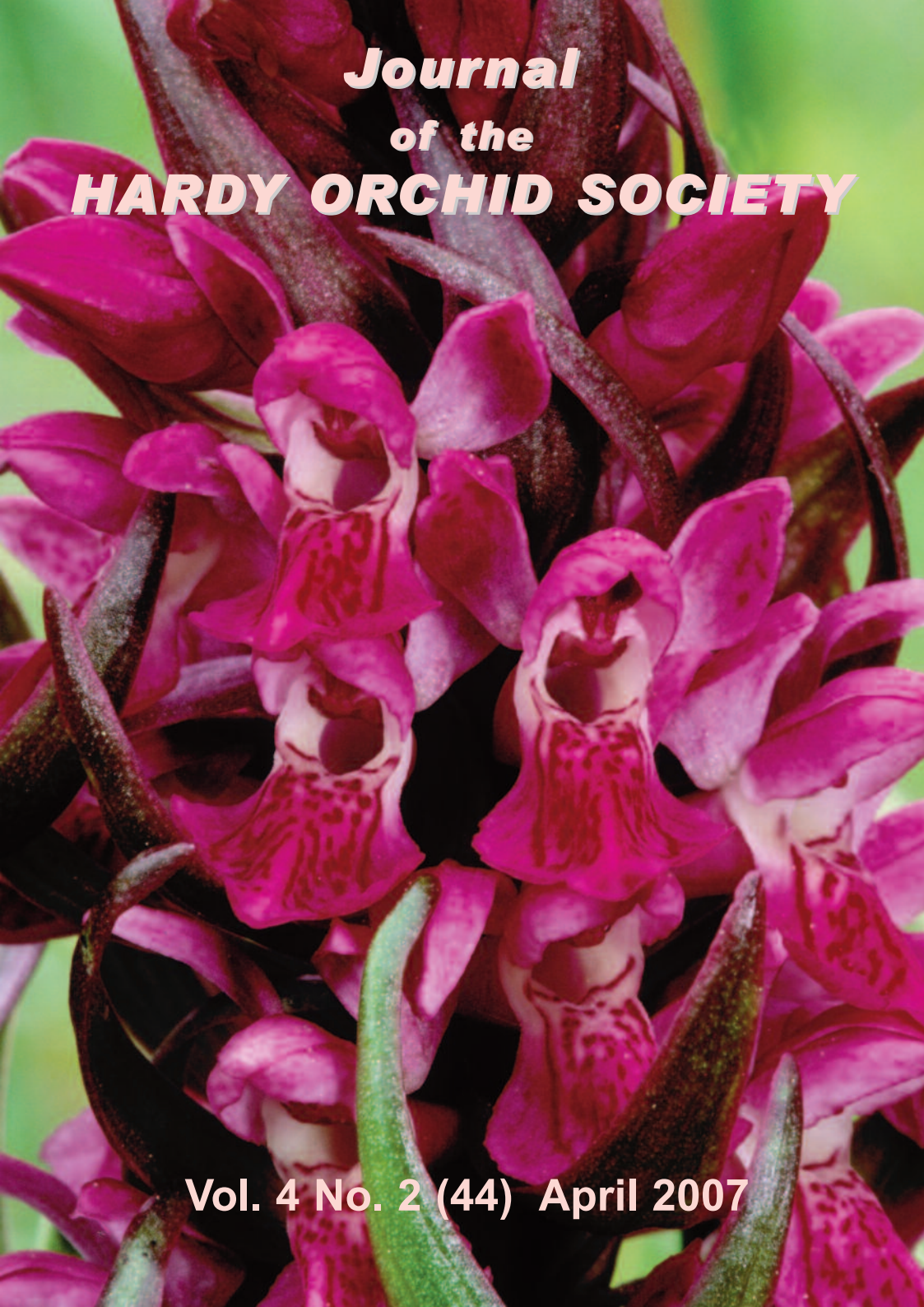

Journal of the HARDY ORCHID SOCIETY

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The Hardy Orchid Society

Our aim is to promote interest in the study of Native European Orchids and those from similar temperate climates throughout the world. We cover such varied aspects as field study, cultivation and propagation, photography, taxonomy and systematics, and practical conservation. We welcome articles relating to any of these subjects, which will be considered for publication by the editorial committee. Please send your submissions to the Editor, and please structure your text according to the "Advice to Authors" (see website, January 2004 Journal or contact the Editor).

The Hardy Orchid Society Committee

Front Cover Photograph

Dune form of Early Marsh Orchid, *Dactylorhiza incarnata* subsp. *coccinea*, photographed in North Norfolk by Mike Gasson (see article on page 58).

www.hardyorchidsociety.org.uk

Contents

Editorial Note

A couple of errors crept in to the last issue of the Journal with an incorrect date for the 2007 Wisley meeting, and inaccuracies with two of the e-mail addresses for field trip organisers. Sorry for any confusion that this has caused, and the correct information is included in the panel below.

With the move to using more photographs in the Journal, it would be good to receive top quality images that you feel deserve to be published, even if divorced from an article. In particular, images suited to use as a front cover are welcome. These would need to have areas suited to carrying the title and date captions. I can't guarantee to use them, but finding a suitable image related to the contents of an issue can be a struggle, and having an archive of options would be very useful.

HOS Meetings 2007

Saturday 15th September: Northern Meeting at Harlow Carr, Harrogate. Contact David Hughes.
Sunday 28th October: Autumn Meeting (including Photographic Competition) at RHS Wisley. Contact Maren Talbot.

Field Trips

Places are still available on field trips organized by: Norman Heywood to Purbeck on Sunday 29th April (nandaatngf@supanet.com); Martin Jackson to Derbyshire on Sunday 13th May (mpjarmadillo@yahoo.co.uk); Nigel Johnson to Noar Hill, Hampshire on Sunday 10th June (nigel@johnson9995.freeserve.co.uk); Alan Blackman to Kent, including *Orchis simia* amongst other goodies, on Sunday 27th May (ophrys@talktalk.net). As some trips are full with a reserve list, please communicate any cancellations ASAP. Further details of all field trips are in the January Journal, but please use these e-mail addresses!

Photographic Competition Second Place Winners

The second place winners from the 2006 Photographic Competition are reproduced below and on the following pages. As previously, the plate numbers relate to the entry class (e.g. Plate 1 is the second place photograph in Class 1). In two cases where there were equal second place winners, these are differentiated by an additional letter (a and b).

Plate 1 *Cypripedium* & *Cephalanthera longifolia* in Vercors by Patrick Marks.
Plate 2a *Gymnadenia borealis* in Fife by Patrick Marks.
Plate 2b *Orchis mascula* in Norfolk by Mike Gasson.
Plate 3 *Dactylorhiza* ×*grandis* in Norfolk by Mike Gasson.
Plate 4 *Ophrys omegaifera* by Neil Hubbard.
Plate 5 *Orchis mascula* in Derbyshire by Graham Giles.
Plate 6 *Orchis mascula* in France by Ron Harrison.
Plate 7a *Orchis* (*Aceras*) *anthropophorum* at Lherm, France by Ron Harrison.
Plate 7b *Ophrys sphegodes* in Dorset by Malcolm Brownsword.
Class 8 *Orchis purpurea* at Lherm, France by Ron Harrison.
Class 9 *Anacamptis* (*Orchis*) *boryi* by Rosemary Webb.
Class 10 *Orchis mascula* at Clio by Geoff Rollinson.
Class 11 *Dactylorhiza sambucina* by David Hughes.
Class 12 *Orchis punctulata* in Cyprus by Mike Gasson.


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2b


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12

Orchids of Western Tuscany I. Elba

Richard Bateman and Paula Rudall

As HOS members will already know, our need to maximize sampling of European orchid species for research purposes means that our field trips tend to focus on known orchidological hot-spots. It also means that we generally rely heavily on records already amassed by other orchidologists, both published and unpublished. However, having already conducted such a short, sharp excursion to Cyprus in March 2006 guided by Barry Tattersall and Richard Manuel (Bateman, 2006), we then decided to indulge in a more speculative, trail-blazing excursion. After much debate, we settled on the Tuscan coast as being affordable and a potentially good compromise between orchidological and cultural interest, since it features such notable historic cities as Firenze, Pisa and Lucca. The trip was divided into two discrete halves. We spent five days of the second week of May on Elba, off the Piombino peninsula halfway along the Tuscan coast. We then spent five days of the third week of May in the Apuan and Orecchiellan Alps, along the western margin of the Apennines in northwest Tuscany, to the north of Pisa (Fig. 1).

Figure 1. Topographic map of western Tuscany. (courtesy of the *Rough Guide*)

Although we approached the second half of our trip 'blind', we conducted a reasonable amount of research on the orchid flora prior to embarking on the initial, Elban leg. Ackermann & Ackermann (2004) gave detailed locality information and distribution maps based on a 1 x 1 km grid, though the preliminary nature of their survey was reflected in the fact that we experienced little difficulty in adding a high percentage of new records for particular squares. The Ackermanns' listed 23 species and four hybrids, showing a comparatively egalitarian distribution across genera; less dominated by "pseudospecies" of *Ophrys* than many Mediterranean islands, yet with a noteworthy diversity of *Serapias*. They listed a further 17 species previously reported from the island but not found by them or their colleagues. Also striking was the apparent local rarity of many of the species that they had succeeded in locating.

These rarities include the remarkable find of

the easternmost known locality for *Gennaria diphylla* (Frangini, 2004), together with *Neotinea* (*Orchis*) *lactea*, *N. tridentata*, *Orchis purpurea*, *Himantoglossum* (*Barlia*) *robertianum*, *Anacamptis laxiflora* and *Spiranthes aestivalis*. The highest mountain, Monte Capanne, has yielded sporadic records of *Neottia nidus-avis*, *N.* (*Listera*) *ovata*, *Dactylorhiza sambucina*, *D. romana*, *Orchis provincialis*, *O. mascula* and *Platanthera chlorantha*. Also, the problematic *Epipactis* of the Capanne massif certainly merit detailed study by folk willing to delay their visits until July. Some rare *Ophrys* recorded on Elba are taxonomically relatively stable: these include *O. insectifera*, *O. speculum*, *O. tenthredinifera* (*O. neglecta sensu* Tyteca, 2003), *O. bombyliflora*, *O. bertolonii*, *O. fuciflora s.s.*: Ackermann & Ackermann, 2004). However, others are decidedly controversial, such as *O. lucifera* and *O. funerea* in the *fusca* group, *O. crabronifera* in the *argolica* group, *O. montis-leonis* (= *O. tyrrhena*) in the *exaltata* group, *O. classica* in the *sphegodes* group, and *O. garganica* in the *incubacea* group (Tyteca, 2003).

A more detailed, long-term survey by the Italian group GIROS yielded 47 species and infraspecific taxa still considered extant on the island, while rejecting a further seven (Frangini *et al.* 2005). However, their report contained insufficient detail to be of particular use to those of us seeking to follow in their footsteps. Other briefer recent publications provided less detailed overviews (e.g. Breiner & Breiner, 2001, 2002), replaced several widespread taxa with local microspecies names (e.g. Tyteca, 2003), or focused on individual discoveries of particular interest (e.g. Frangini, 2002, 2004). Also useful was a poster on the Elban orchid flora that was presented at the 2005 orchid meeting on Chios, Greece by Frangini *et al.*; this listed 49 species and infraspecific taxa (one of these being considered extinct and four doubtful) plus eight hybrid combinations.

With regard to our own trip, the airport immediately south of Pisa was the obvious starting point. Driving the hired Fiat Punto over 100 km to the cheerless ferry terminal at Piombino was straightforward and depauperate in traffic, apparently reflecting the unwillingness of most local inhabitants to pay the modest motorway tolls. The hour-and-a-half crossing to Portoferraio, by far the largest town on Elba and located midway along its north coast (Fig. 2), was also relatively straightforward; taken together, the two rival ferry companies offer approximately hourly sailings on a "roll-up, roll-on" basis.

The *Rough Guide* to Tuscany introduces Elba thus (p. 302): "Nearly 30 km long and 20 km across, Elba is the third-largest Italian island (after Sicily and Sardinia), yet until thirty years ago it was known only for its mineral resources and as Napoleon's [first] place of exile. Now, however, it's suffering the fate of many a Mediterranean idyll, devoured by tourism in the summer and all but deserted in the off-season … To get the most out of the island, visit in spring …" This is, of course, an unneces-

sary piece of advice to give a Mediterranean orchid enthusiast. Nonetheless, this text effectively sets the overall scene; the orchidologist is well-placed to reap the benefits of a reasonably well-established tourist infrastructure but with the increased flexibility and reduced cost associated with the off-season.

Figure 2. Topographic map of Elba. (courtesy of Baia Blu Tourism)

Although the island is small, we correctly anticipated the nature of the transport system; the main roads are well-surfaced and relatively quiet but sinuous and slow, the secondary roads are passable but unmetalled, to be traversed with care in the absence of four-wheel drive. Thus, in order to ease exploration of the island, we split our visit between two bases. Towns on the island are evenly distributed and divided equally between the coast and inland hilltops; most have an understated charm, while some of the coastal towns also feature extensive remains of Byzantine walls. However, we selected more rural idyll: a one-star farmhouse hotel in the hilltop village of Santa Stefano, southeast of Portoferraio, followed by a three-star hotel in the more touristic village of San Andrea, nestling in a maritime valley along the northwest coast. The former featured delicious home-cooked food, and spectacular sunsets followed by extraordinary light shows performed by myriads of fire-flies, while the latter was set in the middle of an remarkably impressive privately-owned botanic garden, and provided the opportunity to share the luxurious swimming pool with several vociferous tree frogs. It undoubtedly helps to possess a smattering of Italian and/or German, since we did not hear other English voices once during our entire stay.

Next the topography. Elba is shaped like a west-facing goldfish that even features all the requisite fins placed in roughly correct locations (Fig. 2). This peculiar outline primarily reflects the influence of four main upland areas to the northeast, southeast and centre (each typically reaching 400 m) and the more imposing mass of Monte

Figure 3. *Serapias cordigera*. NE Capoliveri, SE Elba. Photo by Richard Bateman

Figure 4. *Serapias neglecta*. NE Capoliveri, SE Elba. Photo by Richard Bateman

Capanne that dominates the west and reaches 1018 m (i.e. it peters out just shy of Ben Nevis). To anyone familiar with limestone-dominated Mediterranean islands such as Crete and Cyprus, Elba is an eye-opener. It has suffered repeated tectonic upheavals through geological time, many associated with the formation of the Alps and the Apennines. Thus, it is a chaotic mélange of rocks. Intrusive igneous bodies dominate much of the island. These include the huge gabbro batholith that underpins Monte Capanne but also encompass bodies rich in more-base-rich rocks such as serpentines. Pre-existing sedimentary rocks were much altered by this magmatic activity, such that you are more likely to encounter marble than unaltered limestone. This extraordinary geological diversity has led to intense mineralogical exploitation since Etruscan times, most strikingly along the east coast. When combined with a considerable altitudinal range, the complex geology offers exceptional opportunities for habitat diversification and for the evolution of local endemics. Thus, despite the scarcity of limestones, one would (correctly) predict a diversity of orchids beyond that expected of an average temperate island a mere 28 x 19 km (224 km^2) in size.

In terms of land usage, two lowland strips immediately behind the head of the goldfish and immediately in front of its tail are devoted to agriculture via diverse smallholdings that, among other products, yield the island's under-rated wines. However, the three more montane areas separated by these strips, collectively covering the bulk of the island, constitute an extensive national park. Much of this area is blanketed in dense, diverse and rather impenetrable scrubby woodland,

little if any of which has passed undisturbed by man, though it is now being allowed to undergo natural regeneration wherever rootling by wild boar is not too intense (in contrast, the usual *bêtes noires* of Mediterranean orchidologists, namely goats, were little in evidence). Drier (often south-facing) areas yield rather more characteristically Mediterranean maquis and phrygana, while the highest peaks in the Capanne massif maintain a vaguely alpine flora above the 800 m tree-line.

In the course of five days we were able to get a reasonable taste of every geographical region and habitat on the island. The most striking feature was that, with the exception of a few woodland specialists, the orchid flora is largely restricted to the margins of roads and tracks. Admittedly, this trend is evident across the Mediterranean, but we have not seen it expressed anywhere else as strongly as on Elba. Secondly, individual sites are relatively impoverished in orchids. The two richest localities each yielded just eight species plus one hybrid. They faced north and were located at relatively low altitudes in areas of the centre and southeast of the island, ironically where habitats were most disturbed and fragmented. Every region of the Mediterranean has its own "background" orchid flora. On Elba this consists of *Ophrys incubacea*, *Anacamptis* (*Orchis*) *papilionacea*, *Serapias lingua* and *S. parviflora* at low altitudes, together with *A. morio* in moister locales. Particularly at higher altitudes, shaded habitats typically yield depauperate *Cephalanthera longifolia*, together with *Neotinea maculata* and *Limodorum abortivum*.

Less frequent in lowland habitats, but more impressive, are the distinctive heart-shaped, wine-red labella of *Serapias cordigera* (Fig. 3) and, less frequently, the more spatulate apricot troughs of *S. neglecta* (Fig. 4), an Elban speciality that usually occurs alongside *S. cordigera*. Our best *Serapias* site was found during an ultimately fruitless search for the only recorded Elban locality for *Anacamptis laxiflora* (wetland habitats are rare on Elba), on the golf course at Aquabona. The half-wild garden on one of the mansions bordering the golf course yielded both of these *Serapias* species, together with *S. parviflora* and putative hybrids.

Figure 5. *Ophrys apifera*.
Lacona Beach, SC Elba
Photo by Richard Bateman

Although Elba is renowned for its beaches,

Figure 6. *Anacamptis fragrans* San Piero, SE Monte Capanne. Photo by Richard Bateman

associated dune systems are uncommon. The best dunes lie halfway along the south coast at Lacona, where open pinewoods protect modest populations of two supposed Elban rarities, *Ophrys apifera* (Fig. 5) and *O. tenthredinifera*. Dry, rocky south-facing slopes also proved worthy of attention when they generated basic soils. Good examples included the road on the east coast that leads to the over-rated sulphurous lagoon at Laghetto Terranova, and the spectacular road on the southeast slopes of Capanne south of San Piero. Both yielded substantial populations of *Anacamptis pyramidalis*, the latter also producing *A. fragrans* in full flower (Fig. 6) and suspected *Ophrys speculum* in fruit (each of these three species was recorded only once on Elba by Ackermann & Ackermann 2004).

A snap-shot of the upland vegetation is most readily achieved by driving up the north slope of the Capanne massif to the hill town

Figure 7. View northward from the peak of Monte Capanne toward the bottom of the cable car at Marciana. Photo by Richard Bateman

of Marciana, and then taking the 1.7 km-long cable-car ride to the very top of Monte Capanne. This task is easier said than done, as despite the liberal opening hours advertised, the cable car actually runs only sporadically, according to demand; it is best to arrive at the opening time of 10 am. It is also best to steel your nerves beforehand, as the "gondola" is in reality an over-grown milk-bottle carrier: an open wire cage connected to the cable by a single metal loop (Fig. 7). Each hopper contains only two people, ideally of roughly equal weight and without proclivities toward excessive fidgeting. As well as receiving the opportunity to demonstrate stiff upper lips, riders are rewarded with spectacular views of the entire island, a few *bona fide* alpine flowers, and a chance to descend from 1000 m to 350 m along the hiking trails that ramify down the slopes toward Marciana, thereby passing through each successive vegetational zone. The chestnut woods halfway down, around the refuge of San Cerbone, proved most rewarding, offering in addition to the usual woodland species our first glimpse of *Dactylorhiza 'fuchsii'* on Elba and a tantalising diversity of *Epipactis* shoots, together with our first ever European sighting of a genuine stick-insect. Sadly, we failed to find other specialities previously sporadically recorded on the mountain, such as *D. insularis*, *Platanthera chlorantha* and *Orchis provincialis*. Also impressive for general botany and scenery is the southern half of the road that winds its way across the east slopes of the Capanne massif, from San Piero to Poggio. This road reaches the highest altitude achievable by car on Elba (600 m) at Monte Lerone, from where vigorous walkers can assault the peak of Capanne.

The scientific highlight of our visit was provided by the east–west oriented road that traverses the north coast of Capanne. Heavily wooded and relatively moist, these roadsides and associated streamsides and springs are the Elban headquarters of *Dactylorhiza 'fuchsii'*. It may seem perverse to become excited by finding Britain's commonest orchid on Elba, but these are no ordinary *fuchsii.* The plants are robust and some have annular as well as solid markings on the leaves. The flowers are large, and although the labella show the deep incisions characteristic of *D. fuchsii*, they are relatively dark (cf. *D. fuchsii hebridensis*) and the spurs are much broader than in typical British plants (Fig. 8). Some authors have attributed these taxonomically troublesome plants to *D. saccifera*, whereas Baumann & Künkele (1982,

Figure 8. *Dactylorhiza 'gervasiana'*. S San Andrea, N Monte Capanne.
Photo by Richard Bateman

p. 68) chose to recognise them as a distinct species, *D. gervasiana*, that they considered to be characteristic of the western half of Italy plus Sardinia and Corsica. We look forward to acquiring DNA data from these intriguing populations, as morphological characters suggest that they could represent the as-yet unidentified "missing" diploid parent that, together with *D. incarnata s.l.*, gave rise to the problematic tetraploid complex of *D. majalis s.l.* (Pillon *et al.*, 2007).

Our overall haul for five days work was modest: 15 definite orchid species, plus a further two probable species and two hybrid *Serapias*, compared with 35 species recorded over a similar period in south-central Cyprus in March. In mitigation, we arrived after a dry spell and too late for most of the *Ophrys* species (these are best seen in the second half of April), while we were, as expected, too early for many of the montane specialities. Nonetheless, we caught *Serapias* close to their best, and significantly increased records of mid-season species such as *Anacamptis pyramidalis*, *A. fragrans* and *Ophrys apifera* (also, during our second week in Tuscany we saw the Apuane Alps at their best: see Article 2). Our general impression was that Elba remains seriously under-recorded, but that the paucity of records does not wholly explain the large proportion of Elban orchids that have been reported from only one or two sites. This phenomenon more likely reflects the complexity of habitats on the island and its pivotal biogeographical location, midway between the Italian mainland, Corsica and Sardinia.

In summary, the casual orchidologist would be better advised to concentrate on known orchid meccas. However, jaded veterans tiring of the diminishing returns from repeat visits to familiar hotspots may find the challenges posed by under-explored Elba attractive and even periodically exciting. It offers unusually good opportunities for adding new records of species considered rare, or even further species new to the island. It is of a manageable size, and although its cultural attributes are generally understated, they do at least exist. The island as a whole is affordable, unpretentious and pleasant.

Ideally, a visit to Elba is combined with exploration of other areas in the region. Travelling south to the honey-pot of Monte Argentario would be one possibility (Fig. 1). However, we chose to head for the hills – specifically those north of the Arno; the subject of our second article on the orchids of Tuscany.

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The Early Marsh-orchid in Northern Europe

John Haggar

VII The nominate variety

Dactylorhiza incarnata (as *Orchis incarnata*) was first described by Linnaeus in the second edition of Flora Suecica in 1755. This description was based on a plant from eastern Sweden, probably from near Uppsala or possibly from Öland and was accompanied by a herbarium specimen that undoubtedly belongs to the species that we know as *D. incarnata* today (Pugsley 1935, Pedersen 2000). Entry 802 describes *Orchis incarnata* (in Latin) as having a palmate tuber, a conical spur, an obscurely trilobed and serrated lip and reflexed dorsal petals. Said to occur "rarely" in meadows, the initial diagnosis was followed by a paragraph stating that the species was very similar to the preceding species (entry 801 was *Orchis latifolia*) but differed in the following features; the leaves were pale green and unspotted, the stem was only half as high, the bracts hardly exceeded the flowers, the flower itself was pale flesh coloured rather than red (hence "incarnata") and the dorsal petals were completely reflexed and unspotted.

In 1935, the English botanist, H.W. Pugsley argued that the type specimen of *Dactylorhiza* (*Orchis*) *latifolia*, which had been placed in Linnaeus's herbarium before 1753, was actually a specimen of *D. incarnata* and that according to the rules of botanical nomenclature, the Early Marsh-orchid should rightly be known as *D. latifolia.* Some of Pugsley's arguments were quite compelling, indeed so much so that most eminent English botanists, including the renowned V.S. Summerhayes, adopted *latifolia* as the species name for the Early Marsh-orchid for a period of some twenty years between 1935 and 1955 (Summerhayes 1951). Despite recent moves to

declare the name *latifolia* invalid for reasons of ambiguity, many of Pugsley's arguments remain valid to this day (Pedersen 2000).

There can be little doubt that Linnaeus's *Orchis latifolia* as originally described was a hotchpotch of different *Dactylorhiza* species that probably included *sambucina, majalis*, *praetermissa, praetermissa* var. *junialis* and, most significantly, purple flowered and sometimes leaf-spotted forms of *incarnata*. Linnaeus can surely be forgiven for initially grouping all these plants together; after all it was not until the early part of the last century that *D. praetermissa* and *D. purpurella* were finally separated from *D. incarnata* in Britain (Druce 1914, Stephenson 1923), and not until the late 1930's that it was realised that *D. praetermissa* var. *junialis* was not a late-flowering form of *D. majalis* (Vermeulen 1938).

Pugsley's main point, however, was that Linnaeus's chosen **type specimen** of *Orchis latifolia,* as placed in his herbarium, was almost certainly a plant of the common Swedish Meadow Orchid (*D. incarnata)*. In so far as this decrepit *specimen* can be identified at all, it does seem that it is, indeed, a specimen of *D. incarnata*. The one characteristic that appears to be diagnostic is the form of the cells that line the edges of the bracts. The smooth margin made up of small barrel-shaped cells places the type specimen of *D. latifolia* clearly within *D. incarnata* (*sensu lato*) as currently defined Pedersen 2000, Bjurulf 2005). Furthermore, Linnaeus himself described a specimen of *Orchis palmata palustris non maculata* from Rälla in Öland on June 2nd 1741, and seems to have synonymised this plant with *D. latifolia* in his first edition of Flora Suecica in 1745 (Asberg & Stearn 1973; Pugsley 1935). It seems highly unlikely that Linnaeus would have encountered any marsh orchid other than *D. incarnata* in Öland, because they hardly exist. *D. majalis* is absent from the island and with the exception of two small and very localised populations of *D. curvifolia* (*traunsteineri*) and *D. sphagnicola*, *D. incarnata* is the only marsh species of *Dactylorhiza* to be found there, and it is to be found very commonly (Sterner 1938, Mossberg & Lundqvist 1994). There is no reason to think that the situation was any different a few centuries ago.

As Linnaeus had already described the common Meadow Orchid of Sweden as *Orchis latifolia*, however, one must ask why he would choose to redescribe the same species as *D. incarnata* over a decade later? Why also was it his stated opinion that *O. incarnata* occurred only "rarely" in meadows, whereas *D. incarnata* as currently understood is probably the commonest orchid to be found in wet meadow environments in those areas of Sweden with which Linnaeus was most familiar?

Pugsley maintained that certain characteristics of the 1755 description, namely the short bracts, serrated lip and unspotted dorsal petals, were inconsistent with his own (probably entirely British-based) interpretation of *D. incarnata*, and opined that

Linnaeus had found and described an aberrant pink flowered specimen of *D. sambucina* that "he did not understand". In common with most British botanists of the time, it seems more likely that Pugsley did not realise how different the diploid marsh orchid populations of southeastern Sweden and England were. Arguments raged regarding the proper nomenclature of the Early Marsh-orchid in the post war years, particularly between the Dutch botanist, P. Vermeulen (whose arguments I find less convincing than those of Pugsley) and his English counterparts, Pugsley and A.J. Wilmott. In 1947, Wilmott reported on a visit to Öland made in 1922 by W.N. Edwards to collect specimens of marsh orchids from Linnaeus's Rälla site. Edwards brought back plants to England from an area less than half a mile away from Rälla and exhibited them to the Linnaean Society of London. The tall plants (which still grow in the proximity) were initially incorrectly identified by Druce as *D. praetermissa* (which is absent from Sweden). They were actually specimens of "main" or "central" form *D. incarnata* as described by Mossberg and Lundqvist (1994) and in stature and basic form they closely resembled Linnaeus's own herbarium specimen of *D. latifolia* (Vermeulen 1947; Pugsley 1947; Wilmott 1947).

An early flowering plant bearing many of the features of Linnaeus's original description of *Orchis incarnata* photographed on a fen edge in Öland.
Photo by John Haggar

Illustrated is a specimen of *D. incarnata*, photographed in Öland in the first week of June 1996, which is largely consistent with Linnaeus's 1755 description. In particular, the lip is only very weakly trilobed with a serrated border and the dorsal petals are unmarked and very strongly reflexed. Orchids that take this form tend to be earlier flowering forms of *D. incarnata* in Öland and are often smaller in stature than plants that flower later and they often have shorter bracts. Such plants could quite correctly be called "rare" in many Baltic coast environments where *D. incarnata* is common and usually takes on a more robust form bearing red-purple flowers. It is my belief that Linnaeus mistook this segregate of Meadow Orchid for a separate species (akin to the situation regarding *D. sambucina*, which he clearly separated from *D. latifolia* in his second edition of Flora Suecica) and named it *incarnata* in honour of its pink flowers.

It is now known that such plants are no more than one minor constituent of the polymor-

phic populations of *D. incarnata* that can be found in suitable habitats in the Baltic islands of Sweden. They cannot be differentiated genetically from most of the other forms of the species with which they grow and represent no more than atypically pigmented, diminutive and sometimes early flowering specimens of the species that Linnaeus, in my opinion, intended to be called *Dactylorhiza latifolia.* In view of the fact that both *D. incarnata* and *D. latifolia* were described by Linnaeus from Sweden and that both terms apparently refer to different varieties of the same species, the nomenclature of the species might be facilitated if *latifolia* were still in use. The robust and purple flowered form that appears to be central with respect to flowering time could be termed *D. latifolia* var. *latifolia* and the smaller entity with pink flowers, var. *incarnata*. Alas, though, it is likely that the term *latifolia* will be consigned to oblivion, and the species will remain *Dactylorhiza incarnata*.

It is important, however, to note that whether we call the pink flowered specimens from eastern Sweden subsp. or var. *incarnata*, we have to acknowledge that the terminology **does not** reflect any close genetic association between pink flowered individuals as a whole. Indeed, genetic evidence indicates that the British forms are **more closely allied to one another** than they are to continental forms, and that there are few significant differences that separate the varieties found in southeastern Sweden. Thus a British pink flowered "subsp". *incarnata* from southern England is genetically closer to a "subsp". *pulchella* from the New Forest or to a "subsp". *ochroleuca* from East Anglia than it is to a similar looking pink flowered *incarnata* from Sweden. For this reason, it seems quite inappropriate to refer to the early flowering, pink forms of the southern English fens as subspecies *incarnata.* If any plant can be termed **subspecies** *incarnata*, it can **only** be a plant that shares the features (including the genetic make-up) of the original diagnosis. Thus it would appear that only a plant bearing pink flowers from southeastern Sweden would qualify. Until we have greater understanding of these problems, my own preference is to provisionally call different subtypes that appear to share certain morphological features and flower colours, "varieties" on the understanding that the term **does not necessarily imply genetic relationship.**

D. incarnata from a north Wales fen. This small form carries stronger markings but still bears marked and only partially reflexed dorsal petals.
Photo by John Haggar

A specimen of *D. incarnata* from a wet meadow in Sussex. This rather robust plant has a less reflexed and more obviously trilobed labella with marked and much less strongly reflexed dorsal petals than the plant from Öland. Photo by John Haggar

The British varieties of *Dactylorhiza incarnata* have become segregated to a much greater degree than is the case with their counterparts in Öland and to some extent, at least, according to apparent different habitat preferences (Heslop Harrison 1956). Even in Britain and Ireland, though, these varieties retain a large degree of polymorphism within many of their populations and it is my contention that this variability is largely a primitive state and not due primarily to introgression by other varieties (Haggar 2003b; 2004a; 2004b; 2005a; 2005b). Additionally, what appears to be the "central or main form" in Öland, the midsummer flowering, robust and purple flowered segregate (Mossberg & Lundqvist 1994; Haggar 2003a) that might well have typified Linnaeus's *Dactylorhiza latifolia* is apparently absent from Britain (or **very** rare if one equates the form with purple flowered forms of the poorly defined var. *gemmana*). In most of the fens of southern England (and in similar habitats on the near continent) only early flowering specimens bearing pink flowers can be found. It is my suspicion that the observed differences are closely associated with the virtual absence of allotetraploid marsh orchids in Öland and their frequent occurrence in Britain. In addition, it is my belief (in common with Hedrén) that a plant with purple flowers, morphologically very similar to the Ölandish "central form" of *D. incarnata* is the ancestral parent of *D. praetermissa* and possibly of *D. purpurella* too (Hedrén 1996). This could be another example of a "disappearing parent", its genes having become incorporated completely into the allotetraploids over time (Bateman 2006). Much has been written regarding the origin of allotetraploid marsh orchids from *D. fuchsii* and *D. incarnata*, but I believe that this is the first time that it has been suggested that this genesis and subsequent spread could have profoundly affected both the form, flower colour and habitat preferences of one of the founder species (i.e. *D. incarnata*). In my next and final article, I will present as yet unpublished evidence from crossbreeding experiments to show how such a process could occur and try to answer the questions that I have left open in previous chapters.

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Dactylorhiza incarnata at Holme Dunes
by Mike Gasson

Holme Dunes is located on the North Norfolk Coast where the North Sea meets the Wash. The whole area is a birder's paradise, and whilst ornithology attracts many visitors, there are some interesting orchids. The landscape is dominated by sand dunes towards the sea, and there is an extensive area of freshwater grazing marsh further inland. The latter is host to large numbers of Southern Marsh Orchids (*Dactylorhiza praetermissa*), and the occasional flowering plant can be found on the roadside verges.

A relatively large colony of *Dactylorhiza incarnata* subsp. *coccinea* (see cover photograph) nestles at the bottom of a dune slack. This primary colony was recorded in the detailed biometric study of the species by Bateman and Denholm (1985), and the subspecies is found elsewhere in the dune system. In addition, *D. incarnata* subsp. *incarnata* is present in an array of colour variants. Plants with pale flesh coloured flowers are present, but these are accompanied by others with rose pink flowers and some attractive albinos. Interesting plants with distinctive purple or lilac coloured flowers can be found, especially early in the season. East Anglia is noted for colour polymorphism in its Early Marsh Orchid colonies and John Haggar discussed this in detail in one of his earlier articles (Haggar, 2004).

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Above: *D. incarnata* subsp. *coccinea* with an unusually pale background colour; Opposite: Four colour variants of *D. incarnata* subsp. *incarnata.*




Survey of the Spurs of European Butterfly Orchids

Richard Bateman and Roy Sexton

Background

HOS members who regularly attend meetings or read the *Journal* will likely be aware that we have been pursuing research on the two British species of *Platanthera* using detailed morphometric measurements. One of us has studied both *P. chlorantha* and *P. bifolia* in southern England, supported by DNA-based data (Bateman 2005; Bateman *et al.* in prep.), while the other has studied *P. chlorantha* morphologically in southern Scotland (Sexton & McQueen 2005).

Although we have measured a wide range of characters (42 in the English study), perhaps the most interesting are those describing the size of the spur. Along with the distance separating the adhesive discs at the base of the pollinia, the dimensions of the spur are considered to be critical in determining the identity of the pollinators. Specifically, the moths' probosces reach deep into the spur in order to access the nectar held in the lower quarter to one third of its length (e.g. Nilsson 1983). It therefore seems reasonable to suspect that spur length plays a key role in maintaining the evolutionary gap that is universally assumed to separate the two European species of *Platanthera*, *P. chlorantha* (Greater Butterfly-orchid) and the relatively small-flowered, narrow-columned *P. bifolia* (Lesser Butterfly-orchid) (Figure 1).

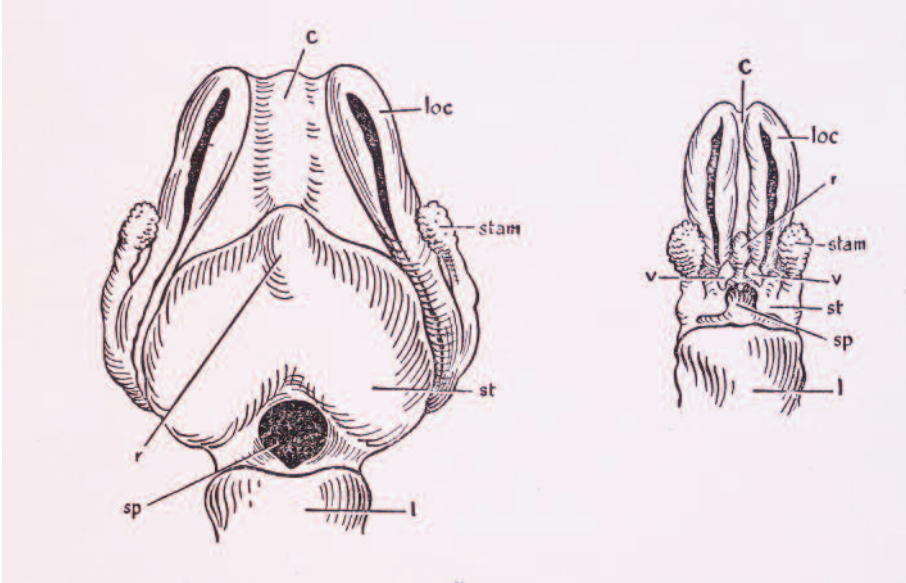

Fig. 1 Comparison of the columns of *Platanthera chlorantha* (left) and *P. bifolia* (right). From V.S. Summerhayes (1951), *Wild orchids of Britain*.

Many of our results to date fulfilled our expectations. The distribution of spur lengths in each measured population duly formed a conventional bell-shaped curve. Also, when the various study populations in southern England were combined, the two species showed very little overlap in spur length. And as expected, spurs of *P. chlorantha* were typically considerably longer than those of *P. bifolia* (averaging 34 mm vs 19 mm). However, we also encountered some surprises. Data from Scotland (very limited in the case of *P. bifolia*) suggest that *P. bifolia* retains its English dimensions there, whereas spurs of *P. chlorantha* are significantly shorter (typically 27 mm: Sexton & McQueen 2005). It is even more startling to compare spurs of English populations of *Platanthera* with those in Sweden (Nilsson 1983), where the two species exchange typical spur lengths (Bateman 2005; Bateman *et al.* in prep.); spurs of *P. chlorantha* are actually *shorter* than those of *P. bifolia* (average lengths 25 mm vs 40 mm).

The impression gained from these observations is that both of these species show small-scale local adaptation and also larger scale regional adaptation to pollinators. If so, this would make them an unusually good model system for studying plant–pollinator co-evolution. *We are seeking* your *assistance to help test these scientific hypotheses.*

The new survey

It is only possible to compare local with regional variation in traits such as spur length by sampling populations at many different geographical localities. This goal can be accomplished by few researchers over many years or many researchers over few years. We would greatly appreciate your help in taking the second, and so speedier, approach.

The main advantage of spur length for this 'citizen scientist' project is that it is relatively easy to measure consistently; far easier, for example, than spur width, as both the cross-sectional shape and flattened width of the spur vary considerably along its length (Bateman *et al.* in prep.). The ideal tool for measuring these spurs is a 15 cm steel ruler, as the finely divided millimetric scale runs to the very end of the rule. This end of the ruler can then be pressed against the backs of the lateral sepals (red arrow in Figure 2), and the length of the spur thereby readily measured from this point to the apex of the spur (yellow arrow in Figure 2). The spur is generally more-or-less straight and parallel to the ovary, though in a few cases it needs to be gently straightened prior to measurement. By this method, the spur measurements can be obtained non-destructively; the chosen flower remains firmly attached to the 'parent' spike, so there are no conservation implications. (In the absence of a steel ruler, it would also be possible to adapt a plastic ruler, by carefully truncating the end adjacent to the beginning of the ruled margin.)

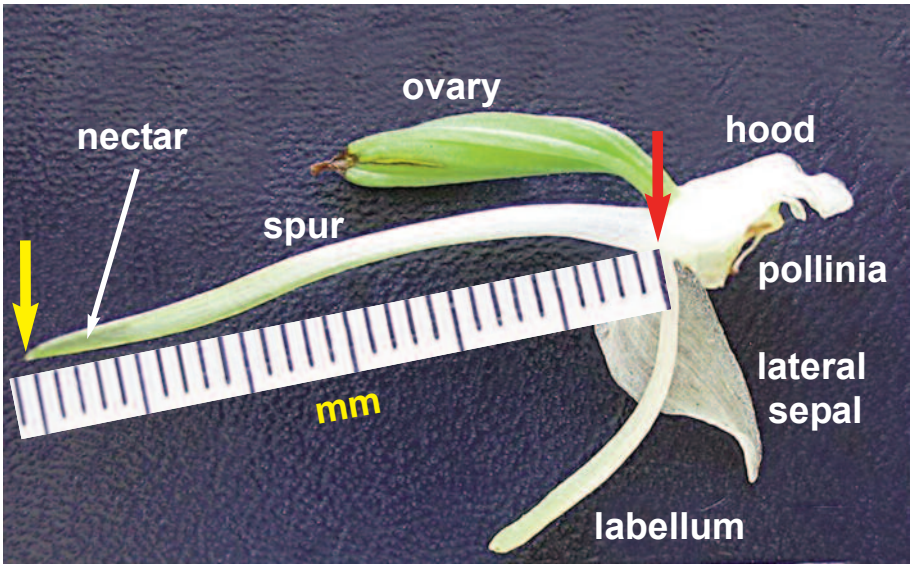

Fig. 2 Lateral view of flower of *Platanthera chlorantha* (the nearer lateral sepal removed) to show the spur length measurement required for the present survey (between the red and yellow arrows; this individual is about 30 mm long). Please note the fact that, during the actual survey, the chosen flowers should not be detached but should remain firmly attached to their 'parent' inflorescences.
Photo by Roy Sexton, modified by Richard Bateman.

An ideal sample from each population would be measurements (each to the nearest 0.5 mm) of single flowers from at least 20 inflorescences per population. It is important that, for each inflorescence, the flower is fully open and it is chosen from the middle of the inflorescence, as for almost all orchid species the flowers decrease considerably in size from the base to the apex of the inflorescence (Bateman & Rudall 2006). Records from mixed populations of *P. chlorantha* and *P. bifolia* would be especially welcome, as such populations are uncommon. However, when tackling such a mixed population, it would be important to use additional characters, notably the orientation of the pollinia (parallel in *P. bifolia*, strongly convergent in *P. chlorantha*: Figure 1), to confirm the identity of each plant measured. Even in such unusually problematic populations, it should require no more than 10–15 minutes to take the 20 spur measurements needed. If just 10% of HOS members measured (a) their local butterfly-orchid population in the UK and (b) one population on their next suitably timed European trip, our database would treble in size during a single field season!

In addition to the set(s) of spur length measurements, we would appreciate information on the date of measurement and the location, habitat and sizes of the population(s) studied.

Please send any results by mail or e-mail (MS Word or Excel attachments welcome) to Richard Bateman, Jodrell Laboratory, Royal Botanic Gardens Kew, Richmond, Surrey, TW9 3DS (r.bateman@kew.org). Respondents will be acknowledged in any resulting populations – and the results will of course be summarised with alacrity in *JHOS*!

Acknowledgement

We thank HOS members who have already contributed in various ways to our *Platanthera* studies, and Ian Denholm for contributing the first data-sets to the present butterfly-orchid survey (from Keltneyburn and Boat of Garten, in the Scottish Highlands).

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Site Secrecy
Bill Temple

As the Conservation Officer I feel that it would be appropriate for me to comment on site secrecy. I am not going to enter the debate about whether everyone should have the right to see rare orchids or whether site protection is more important. I have asked the Journal Editor not to publish details of the sites of rare orchids, forms or hybrids unless the owner of the site has already published that information (as at Hartslock). My reason is totally different to the arguments already aired in the Journal.

In its many years of existence the Hardy Orchid Society has been confined to raising common species for re-introduction into local sites and relocating orchids threatened by building development. However, in the last three years we have been involved in trying to raise seedlings of *Epipactis* "*youngiana*", *Himantoglossum* (*Barlia*) *metlesicsianum* and *Orchis militaris*. These projects involve the Society working with national conservation bodies and Wildlife Trusts and they depend upon them trusting us. We have also been involved with managers of a number of nature reserves and statutory bodies regarding the management of nature reserves and other areas for the benefit of orchids.

Although I am extremely pleased and proud that these projects started during my terms of office, it is due to the combined work and expertise of many committee members (both past and present) and of ordinary members over many years. I would therefore be extremely disappointed if the HOS were to publish locations of rare orchids, someone then dug the plants up and the HOS was blamed for it. This would totally destroy all the trust and prevent us from working on this type of project. I believe that such a risk is real and that the merest hint of suspicion would set the society back many years.

I would also like to point out that I know of a number of sites at which orchids have been dug up illegally in the last few years, and the total number of orchids taken is several hundred. The toll includes Schedule 8 species, the only rare hybrid at a site, the only known chlorotic form, and at one site it has possibly involved more than 90% of the whole population of a relatively common orchid species.

I therefore believe that it is not in the best interests of the Hardy Orchid Society to publish details of the sites for rare orchids, forms or hybrids unless the owner of the site has already published the information.

Keith Lawson would like to join other members for a trip to Germany for Ghost Orchids. Contact moira.lawson9@virgin.net or 01202 877958 (after 23/4/07)

Cambrensis in Cumbria

Nigel and Lois Habron

Cumbria is a good county for the Northern Marsh-orchid (*Dactylorhiza purpurella*), with many verges particularly in the Tebay/Orton/Kirkby Stephen area supporting good populations. The handsome hybrid with the Common Spotted-orchid (*D. purpurella* x *fuchsii*) is also often found, but we have not heard of any variants from the nominate variety in the area.

At the end of May 2005, we were clearing some scrub at Smardale National Nature Reserve (part of the disused railway line between Kirkby Stephen and Tebay) when we came across a few purple-flowered orchids. They were too late to be Early Purple-orchids (*Orchis mascula*) and, we thought, too early to be Northern Marsh-orchids. When we inspected them more closely, we found that many of them had heavily spotted leaves and also spots on the bracts. The area where they were growing was raised a little above the old track-bed, and clearly drier than its surrounds, hence the early flowering. A fortnight later, we re-visited the site, and found many more heavily leaf-spotted marsh orchids at other places near the original site along previously damper stretches of track-bed, with a few on adjacent embankments.

Dactylorhiza purpurella var. *cambrensis* at Smardale
Photo by Lois Habron

Some photographs were sent to our good friend Alan Gendle who passed them on to Professor Richard Bateman, for comment. The word came back that they were, on balance, assignable to *D. purpurella var. cambrensis*. This variant has hitherto been recorded only in west Wales (hence the word '*cambrensis*' - derived from Cambria), Northern Ireland and north-west Scotland, usually within sight of the sea. (Smardale is nearly fifty miles from the coast.) Some Northern Marsh-orchids have spots on their leaves, usually concentrated towards the tip, but *cambrensis* is said to be distinguishable from them by having more heavily spotted leaves, and with bracts spotted and/or washed with purple. The flowers tend to be slightly paler and the lip is more distinctly three-lobed. On a subsequent visit to Smardale with Alan Gendle, we closely examined many of plants in the small area where the first ones were spotted (sic), and found much variation among them. As we walked along the track, the orchids eventually became more typical *D. purpurella*, possibly suggesting hybridisation, or perhaps it would be more accurate to say 'introgression', between the two populations.

If the *cambrensis* orchids at Smardale were the only such plants in Cumbria, then it might be reasonable to assume that they had been imported from materials used to construct the railway, but the story doesn't end here. Just over two miles to the north-west of the old railway line lies Sunbiggin Tarn. The common land to the west of the tarn is a wonderful place for plants, including many species of orchids. Alongside relatively unspotted northern marsh-orchids are several heavily-spotted examples. No doubt seed could be carried that far from the railway site, but at a road junction in the Shap area some nine miles north-west of Smardale, there are hundreds of heavily spotted Northern Marsh-orchids. In truth, this site is quite close to another railway, so the 'import theory' could still apply here, although most orchid seed prefers to fly rather than travel by rail! However, 25 miles away in the far east of Cumbria, high up in the Pennines, we have examined several strongly spotted Northern Marsh-orchids in the Nenthead area, at an altitude of around 1,500 feet. In the past, the area was subjected to intensive mining for lead, so there would have been much disturbance of soil, but the nearest railway was five miles way.

It does look as though *cambrensis* - (or *cambrensis*-like) - orchids have been in Cumbria for some time, so perhaps they should be renamed *cumbrensis*! Having said this, the Cumbrian plants attributable to *var. cambrensis* have been described by Professor Bateman as "closer to the middle of that continuum than are the more extreme populations found in Wales and Scotland."

We would like to thank Alan Gendle and, in particular, Richard Bateman for help and advice in the writing of this article.

Dactylorhiza purpurella plants at Sunbiggin (Plates1 and 3), Smardale (Plate 2), and Nenthead (Plate 4). Photos by Lois Habron


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Sources of Small Research Grants for Orchid-Related Research

Richard Bateman

I would hope that, by now, Hardy Orchid Society members are in no doubt regarding the significant contribution that they have made through the last decade to my "professional" research into the systematics and evolution of European terrestrial orchids. However, fewer members may know that, for the preceding 15 years, I pursued my orchid research on an "amateur" basis, relying on my geological background rather than my orchid obsession as the mainstay of my academic career. During this period, several small grants provided by specialist funding bodies had a disproportionately large effect on my ability to maintain a modest programme of orchidological research. The grants were especially valuable in permitting the fieldwork necessary for me to gather morphometric data and, latterly, to collect samples for molecular analysis.

I have long been surprised that so few UK-based orchid enthusiasts follow the example set by many of their Continental colleagues (reported in journals such as *Journal Europäischer Orchideen*, *Abeitskreische Heimische Orchideen* and *Naturalistes Belges*) in gathering detailed morphometric measurements from the populations that they regularly examine, in order to improve our ability to circumscribe and identify orchid taxa. Similarly, ecological understanding has been increased by studies involving the long-term monitoring of the annual leafing and flowering patterns of particular orchid populations, and/or projects that gather quantitative data of pollinator visits and/or percentages of capsules that set seed. Such studies are of considerable scientific value, and often lead to better informed conservation recommendations. They too lend themselves to "amateur" investigation potentially leading to "professional" results. Indeed, these activities can give greater focus and significance to the field excursions that most of us pursue as a matter of course, motivated simply by the sheer thrill of the chase.

Moreover, fieldwork is not the only area of activity that can benefit from small injections of a few hundreds or thousands of pounds of research funds. For example, there is also the collective expertise of HOS members in raising hardy orchids from seed, which has already contributed to various conservation projects. Would it not be preferable to have another charitable body negate the costs of purchasing the equipment and/or consumables necessary to pursue these worthwhile home-based tasks?

Below I have summarised several well-established, ongoing sources of such research funding. My primary aim is to encourage HOS members to develop their own funding applications. In most cases, the amount of information required by funding charities from applicants is small and proposals need not be time-consuming to compile, though in my experience plenty of thought should be given to the

application before putting pen to paper (or, more accurately, finger to keyboard); these are, after all, genuinely competitive schemes. The best place to start is generally the organisation's website, assuming that they have one.

In this context, prospective applicants to any of these schemes might consider first reading the advice to applicants on the Systematics Association website (given below). I recently penned this advice on the basis of having assessed applications ever since I helped found the Small Grants scheme in 1995 and its more ambitious successor, the Systematics Research Fund, in 2002. I believe that these recommendations are generally applicable to any such scheme, though a couple of additional points are warranted. Firstly, if your initial application fails, ask the scheme coordinator why, and learn from any answers given. Although you are likely to have to wait six or twelve months before you can resubmit your (hopefully reinvigorated) proposal, in my experience time passes ever more quickly, and the probability of success usually increases substantially with a thoughtful resubmission. Secondly, if you do obtain the desired funds, and then successfully conclude the project, don't forget to tell the funders – they too relish even modest successes.

***Scheme*:** Systematics Research Fund
***Run by*:** Systematics Association and Linnean Society
***Submit by*:** December 31st
***Maximum award*:** £1500 (total £29k pa)
***Success rate*:** ca 35%
***Application*:** One-page A4 questionnaire plus one-page proposal (web-based only)
***Stated purpose*:** Any aspect of comparative biology; fieldwork, purchase of scientific equipment, consumables or expertise, specimen preparation, publication costs (not conference attendance).
***Contact*:** Dr Julie A Hawkins, Chair, Grants & Awards Committee, Systematics Association, c/o School of Plant Sciences, University of Reading, Whiteknights, Reading, RG6 6AS, UK. http://www.systass.org/awards/

***Scheme*:** Small Grants Scheme
***Run by*:** Botanical Society of the British Isles
***Submit by*:** February 6th
***Maximum award*:** £1000 (total ca £10k pa)
***Success rate*:** ca 50%
***Application*:** One-page A4 questionnaire plus one-page proposal
***Stated purpose*:** "Support research to enhance knowledge of the flora of the British Isles"
***Contact*:** Pete Hollingsworth, Royal Botanic Garden Edinburgh, Inverleith Row, Edinburgh, EH3 5LR, UK
p.hollingsworth@rbge.org.uk; http://www.bsbi.org.uk/html/grants.html

***Scheme*:** Botanical Research Fund
***Run by*:** BRF Trustees
***Submit by*:** ?February 6th
***Maximum award*:** £1000 (total ca ?£5k pa)
***Success rate*:** ?ca 50%
***Application*:** One-page A4 proposal (no proforma)
***Stated purpose*:** Botanical investigations of all types, especially botanists who are unable to obtain support from major funding bodies.
***Contact*:** Dr Mark Carine, Dept. of Botany, Natural History Museum, Cromwell Road, London, SW7 5BD
m.carine@nhm.ac.uk; no known website

***Scheme*:** Research Grants
***Run by*:** American Orchid Society
***Submit by*:** January 1st *and* July 1st
***Maximum award*:** $12,000 [£7,500] (total ca $25k pa)
***Success rate*:** Unknown
***Application*:** Up to 15-page A4 proposal
***Stated purpose*:** "Non-commercial conservation projects, … experimental projects of fundamental and applied research on orchids, [including] taxonomy, genetics, anatomy, physiology, development, tissue culture and ecology." Covers salary, equipment, travel (usually not collecting); also publications.
***Contact*:** AOS, 16700 AOS Lane, Delray Beach, Florida, FL 33446–4351, USA
TheAOS@aos.org
http://orchidweb.org/aos/uploadedfiles/docs/guidelinesgrants.pdf

***Scheme*:** Research Grants
***Run by*:** Stanley Smith (UK) Horticultural Trust
***Submit by*:** February 15th and August 15th
***Maximum award*:** ?£20,000 (total ca ?£80k pa)
***Success rate*:** Not known.
***Application*:** Few-page A4 proposal; no format specified, but include budgets, long-term prognosis, and (where appropriate) staffing information.
***Stated purpose*:** Includes advancing research in any brand of horticulture and publication of scientific results; promotion of the cultivation and wide distribution of horticultural plants (*not* commercial).
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