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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 for Authors'

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Anacamptis robusta: Photo by Richard Bateman

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New Subscription Rates

The Hardy Orchid Society Newsletter has now become a Journal complete with more coloured illustrations that are placed with the articles rather than in the centre. At the 2003 AGM it was decided to upgrade the magazine, but this costs money so subscription rates have been increase for the year 2004 to 2005 by £4.00. The complete list of subscription rates is given below.

Many of you pay by Standing Order. We find this very helpful and are grateful to those who pay this way. If you pay by Standing Order, please ask your bank to change the amount to the new price. If you do not pay by Standing Order at the moment, but wish to in the future we would be happy for you to do so. You will need to obtain a form from the Membership Secretary, Maren Talbot. The bank details for HOS are given below.

Subscription Rates

There is an enrolment fee for all new members, Single or Family, of £2.50 when sending your initial subscription. Please add this to amounts below when first joining.

Single Members: Britain & Europe:	£12.00
Single Members: All Other Countries:	£16.00

Family Annual Subscription: (Britain/Europe)	£15.00
Family Annual Subscription: (All Other Countries)	£19.00

Bank details: HSBC, 1 Market Place, Wells, Somerset, BA5 2RN.
Account No. 21185527, Sort Code 40 46 06

Spring Meeting/AGM- Kidlington 25th April 2004

Roger Gelder, Meeting Organiser

The next meeting will be on Sunday, 25th April at Exeter Hall, Kidlington, near Oxford it incorporates the twelfth Annual General Meeting (AGM) and the Spring Show.

A sketch map plus application form is enclosed with this Journal. Use of the application form is essential to give us information on attendance and for catering requirements. Costs, for all wishing to attend, are detailed on the application form.

Application forms MUST be returned by the 17th April to secure a lunch !

Members are asked to bring their membership cards with them and are reminded that the annual society subscription is due on 1st May.

Please bring your competitive entries for the Plant Show (see next article in this Journal for Plant Show schedule) and there should be room to display any other orchid-related material that you would like to exhibit (please forewarn us of large amounts of posters etc). All proceedings are on the ground floor and cars may pull up to the rear of the hall for easy unloading/loading of plants.

“Trade” plant sales will be subject to a charge of £25 per table, payable in advance and booked with Roger Gelder. A sales table for members’ plants will be present and people are encouraged to bring along their spare plants. Plant sales will not be restricted to orchids, so please bring along any plants that may appeal to hardy orchid enthusiasts. Double labelling to indicate plant name and selling price should be adopted if possible. Sellers will be expected to donate 10% of monies to the Society.

Nominations are invited for officers and committee posts. The following position will become vacant at this meeting – **Hon. Vice-Chairman**. All nominations for the committee should be received by the Hon. Secretary 14 days prior to the A.G.M, with names of a proposer, a seconder and the consent of the nominee. In the event of no nominations being received for an office, nominations will be accepted from the floor.

Programme for the Spring Meeting/AGM

09.00 - Meeting opens: Coffee/Tea, informal chat. Plant Sales tables open. Staging of entries for the Plant Show and non-competitive materials before 09.45.

10.30 - Chairman’s introduction and welcome to Kidlington, followed by AGM.

Tea/Coffee

11.30 - Ian Butterfield - “Pleiones”, followed by discussion.

13.00 - Lunch, Tea/Coffee.

14.00 - Capt. Peter Erskine - “Terrestrial Orchids in the Southern Hemisphere”.

15.00 - John Fielding - “Orchids and Other Flowers of Crete”, followed by discussion.

16.00 - Closing announcements and comments.

Next Meeting (i) Harlow Carr - Sunday 12th September 2004.

Next Meeting (ii) Capel Manor - Sunday 31st October 2004.

16.15 - Tea and informal chat, plus final opportunity to browse stalls and view show exhibits. Meeting venue to be vacated by 17.00.

HOS Plant Show, 25th April 2004

Doreen Webster, Show Secretary

As usual, the Annual Plant Show will take place during the HOS Spring Meeting at Kidlington. The Show Rules and the Schedule of Classes are printed below. All you have to do is turn up before 9.45 a.m. with your plants, and we will try to find a class to fit them in. Pot size doesn't matter – provided you can carry it! Photos of winning plants will appear on the HOS Website, as well as a selection in the July issue of the Journal. The owner of the best entry will be allowed to borrow our “Best in Show” trophy for a year. If you have any other orchid odds and ends that you think might interest others, please bring them along to go in our usual non-competitive exhibition.

The Hardy Orchid Society – Plant Show Rules

1. **ELIGIBILITY** - All classes are open to all members of the Hardy Orchid Society.
2. **ENTRY FEES** - No entry fees will be payable.
3. **SHOW DETAILS** - Advance entry is not required. Members will be informed in a Newsletter preceding the Show of the time by which exhibits must be staged, and the earliest time at which exhibits may be removed.
4. **OWNERSHIP OF EXHIBITS** - All exhibits must have been owned by the exhibitor for at least six months.
5. **NUMBER OF PLANTS PER POT** - Unless otherwise stated, each pan may contain more than one plant, provided all plants are of the same variety. However, when more than one flower spike is present, ‘uniformity’ will be one of the judging criteria.
6. **LABELLING** - All plants should be correctly and clearly named. However, incorrect or unclear labelling will be considered only in a close competition.
7. **JUDGING** - The judge is empowered to withhold awards where entries are not of adequate standard.
8. **PROTESTS** - Any protest must be made to a member of the Committee within one hour of the opening of the hall after judging. The decision of the Committee will be final.
9. **LIABILITY** - While the Hardy Orchid Society will endeavour to take good care of

all exhibits, it will not be liable for compensation for any damage or loss, however caused.

SCHEDULE OF CLASSES

1. Six pots hardy orchids, distinct varieties.
2. Three pots native British orchids, distinct varieties.
3. Three pots native European (non-British) orchids, distinct varieties.
4. Three pots non-European orchids, distinct varieties.
5. Three pots hardy orchids distinct varieties, any country of origin.
6. One pot native British orchid.
7. One pot native European (non-British) orchid.
8. One pot non-European hardy orchid.
9. One pot *Dactylorhiza*.
10. One pot *Orchis* and related Genera.
11. One pot *Ophrys*.
12. One pot *Serapias*.
13. One pot *Cypripedium*.
14. One pot, any other genus of hardy orchid.

Hybridisation Evidence Supports the New Improved *Anacamptis* Richard M Bateman

A serendipitous discovery

On 16th April 1998, I surveyed the north-eastern margins of the extensive coastal reed-marsh at Albufera, immediately south of Alcudia on the north-east coast of the Balearic Island of Mallorca, Spain. My main objective was to sample for DNA-based phylogenetic analysis the well-known population of the rare and taxonomically controversial marsh-dwelling terrestrial orchid *Anacamptis* (formerly *Orchis*) *robusta* (e.g. Gözl & Reinhard, 1976; Cozzolino *et al.*, 2003). (See front cover picture) While entering the eastern end of the marsh from the slightly elevated coast road that separates the marshes from the adjacent linear dune system, I encountered two closely-spaced plants of striking appearance located on the zone of ecological overlap (termed an ecotone) between the marshes and dunes. They were immediately suspected of being hybrids between two morphologically dissimilar species: *A. robusta*, growing in the marsh, and *A.* (formerly *Orchis*) *fragrans*, growing adjacent to the suspected hybrids in the ecotone and dunes (see photographs). If correctly identified, this hybrid is new to science; the presumed hybrids and both parent species were therefore sampled.

The primary goals of the study (soon to be formally published as Bateman & Hollingsworth, 2004) were to use both morphological and DNA-based measurements (1) to confirm the identity of the two plants as hybrids, (2) to confirm the identities of the suspected parental species, (3) to distinguish between the maternal and paternal parents, and (4) to explore the behaviour of specific characters in the hybrids relative to the parental species.



The Albufera marshes, the best known habitat for *Anacamptis robusta*. The new hybrid was found beneath the pines in the extreme right of the frame.

Photo: Richard Bateman.

The purpose of this article is to summarise our study of the hybrid, since named *Anacamptis x albuferensis*, with the main aim of placing this discovery in the broader context of the expansion and redelimitation of the genus *Anacamptis*. I also review evidence of the frequency and reliability of records of hybridisation involving *Anacamptis*, beginning with the *A. fragrans* and *A. robusta* groups.

Taxonomic and nomenclatural background

Although the taxonomic histories of both parents of *A. x albuferensis* are fairly complex, both histories can be reduced to two main trends: (1) increasing taxonomic rank for the named entities, paralleling the overall taxonomic inflation that has plagued European orchid studies through the 20th century (compare, for example, the taxonomic treatments in Sundermann, 1980 versus Delforge, 2001), and (2) the recent revelation, based on molecular phylogenetic evidence, that the genus *Orchis s.l.* as recognised by most recent authorities has three independent evolutionary origins and should therefore be taxonomically reorganised. *Orchis s.s.* was substantially reduced in taxonomic scope, whereas the formerly narrowly delimited genera *Anacamptis* and *Neotinea* were expanded to incorporate at least half of the species previously included in *Orchis* (e.g. Bateman *et al.*, 2003). *Anacamptis robusta* (T. Stephenson) R.M. Bateman (Bateman *et al.*, 2003) was first named by Stephenson in 1931 as an unusually robust variety of *Orchis palustris* Jacquin, a species that is widely distributed but locally concentrated in marshes across Europe, western Asia and North Africa. It was raised to subspecific status by Sundermann (1980) and to a full species in a taxonom-

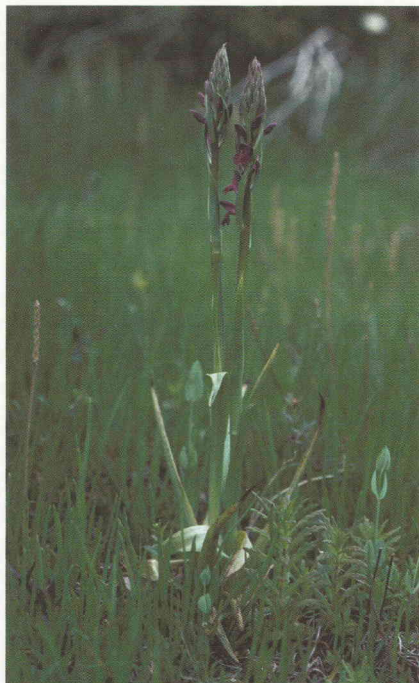
ic note by Gözl & Reinhard in 1975, a decision soon reinforced by the results of their morphometric survey of the *palustris*–*laxiflora* group (Gözl & Reinhard, 1976). The taxon was first transferred to *Anacamptis* as *A. palustris* subsp. *robusta* by Bateman *et al.* (1997, p. 120), but once DNA sequence data were available for *A. robusta*, rather than just for the more widespread and frequent *A. laxiflora*, *A. robusta* was tentatively elevated to species level by Bateman *et al.* (2003).

Anacamptis fragrans (Pollini) R.M. Bateman (Bateman *et al.*, 2003) has a similar taxonomic history to *A. robusta*. Although first described as a full species, *Orchis fragrans*, as early as 1811 by Pollini, most authors during the period 1910–1990 considered *fragrans* to be a subspecies or variety of Linnaeus' (1753) *Orchis coriophora*, namely *O. coriophora* subsp. *fragrans* (Pollini) Sudre or var. *fragrans* (Pollini) G. Gussone. The *coriophora* group has a similarly wide distribution to the *palustris* group and a wider ecological tolerance, *fragrans* in particular tolerating much drier soils. As with *robusta*, this taxon was first transferred to *Anacamptis* as *A. coriophora* subsp. *fragrans* by Bateman *et al.* (1997, p. 120), but once comparative DNA sequence data were available the taxon was tentatively elevated to species level by Bateman *et al.* (2003). The more robust but smaller-flowered, foetid-smelling *A. coriophora* s.s. is now regarded by most authorities as a widespread but local taxon. Despite its preference for marshes, *A. coriophora* s.s. is not thought to occur at Albufera, or indeed anywhere on the Balearic Islands (e.g. Delforge, 2001).



Anacamptis fragrans
Photo: Richard Bateman.

Delforge (2001) recognised six full species in the *laxiflora*–*palustris* group: *robusta*, *palustris*, *elegans*, *pseudolaxiflora* (= *dielsiana*), *laxiflora* and *dinsmorei*. The three most widely recognised taxa, namely *laxiflora*, *palustris* and *elegans*, all have past records of hybrids with *A. coriophora* s.l.; the progeny were named respectively '*Orchis*' x *parvifolia* Chaubard (1821), '*Orchis*' x *timalii* Velenowsky (1882), and '*Orchis*' x *reinhardii* Ugrinsky ex Camus (*in* Camus *et al.*, 1908). However, I am not aware of any previous reports of hybrids between the *A. coriophora* group and *pseudolaxiflora* or *dinsmorei* in the eastern Mediterranean or *robusta* in the west.



Anacamptis hybrid plant
Photo: Richard Bateman



Anacamptis hybrid flowers
Photo: Richard Bateman

Further morphological and molecular research is desirable to test the species status of *A. fragrans* and *A. robusta*. If either proves not to be a full species then *A. x albuferensis* is not truly a new hybrid.

Phylogenetic background

The recent comprehensive phylogeny (evolutionary tree showing the relationships among species) for the orchid subtribe Orchidinae based on the nuclear ribosomal Internal Transcribed Spacer region (ITS: Bateman *et al.*, 2003) included 16 species of the revised genus *Anacamptis*, thereby encompassing all its widely recognised species (cf. Sundermann, 1980; Delforge, 2001; Nelson, 2001).

The resulting evolutionary tree strongly resolved three clusters of closely related species, namely the *laxiflora-palustris* group, the *coriophora-sancta* group, and the *morio-boryi* group. The *laxiflora-palustris* and *morio-boryi* groups were each further delimited by single characteristic insertion-deletion events (termed indels: places where extra portions of DNA are evolutionarily added or removed). The tree also identified three more isolated species, namely *A. collina*, *A. papilionacea* and the original species of *Anacamptis*, *A. pyramidalis*. Although these six groups are well-resolved groups, relationships among them are uncertain, the divergence evident in ITS sequences being matched by diversification in several chromosomal features and

together suggesting a rapid radiation in the genus several million years ago. The one exception to this poor inter-group resolution is, however, especially relevant: the *laxiflora-palustris* group unequivocally diverged before all the remaining groups of species.

The limited data at our disposal describing degrees of DNA sequence divergence for ITS (and also for the chloroplast genic region *trnL*) are tantalising with regard to determining the most appropriate taxonomic status for the putative parents, *A. robusta* and *A. fragrans* (e.g. Bateman *et al.*, 2003). Data for *trnL* show no divergence between *palustris* and *robusta* but considerable divergence between *coriophora* and *fragrans*. The ITS tree similarly shows modest divergence between *coriophora* and *fragrans* and less between *robusta* and *palustris*.

Morphological comparison of hybrid and parents

The morphological characters measured were chosen to describe thoroughly all parts of the plant other than the tubers and column, rather than simply to distinguish between the parental taxa. It is therefore remarkable that the two parental species differ significantly in values for 50 of the 57 characters recorded, making the identification of any hybrids between them appear relatively straightforward (see, for example, the flowers reproduced at the same scale in the photographs). Moreover, the nature of the surprisingly small proportion (12%) of characters that are non-diagnostic (i.e. have states shared by both parents) does not reflect any obvious patterns; they can therefore probably be ascribed to *ad hoc* coincidence. The strong morphological contrast between the parents is matched by clear intermediacy of the hybrid in 28 of the 57 characters scored. The hybrid lies outside the ranges of both parents in seven characters, closely resembles *robusta* in eight characters, and closely resembles *fragrans* in 14 characters. In a comparable study, Bateman & Farrington (1987) found that a naturally occurring hybrid discovered by them in Kent closely resembled *Orchis anthropophora* in five characters and its other parent, *O. simia*, in 13 characters, thus showing a corresponding degree of asymmetry of similarity to the presumed father versus the presumed mother. If, as is suggested by artificial crosses (R. Manuel, personal communication, 2002), hybrids have a stronger morphological resemblance to the maternal parent, the morphological prediction would therefore be that *fragrans* is the source of the unfertilised ovules and *robusta* is the source of the pollen that together generated the fertilised seeds that subsequently germinated to produce *A. x albuferensis*.

Molecular comparison of hybrid and parents

The two putative hybrid plants yielded identical results for all of the DNA-based techniques applied, a result consistent with (but not conclusively demonstrating) our initial hypothesis that one had originated by clonal division from the other. The results corroborated the morphometric evidence that the morphologically intermediate plants are hybrids between *A. robusta* and *A. fragrans*. Moreover, the chloroplast sequence data successfully distinguished the maternal and paternal parents of the hybrid (chloroplasts are inherited only from the mother, as they cannot enter pollen). As expected,

A. fragrans was identified with confidence as the maternal parent; it and the hybrid possessed identical chloroplast DNA sequences.

Thus, the hybrid seed could have originated from an *A. fragrans* plant situated as close as 1 m to their present location, whereas the paternal pollinia almost certainly travelled attached to an insect (probably to the head or upper thorax of a bee) over a considerable distance from the closest *A. robusta* found in the marsh, thereby successfully transgressing the ecotone from marsh to dunes. Unless flowering plants of *A. robusta* were considerably more widely distributed in the previous few years than in 1998, the distance travelled by the insect must have been a minimum of 100 m.

Our previous genetic studies of Broad-leaved Helleborine, *Epipactis helleborine* (Squirrell *et al.*, 2001), suggest that, over longer distances, the seed rather than the pollen mass is the main agent of genetic dispersal in orchids (of course, biology dictates that only fertilised seeds can establish new orchid populations; pollinia alone cannot). The dust-like seeds can travel via air currents, whereas distribution of the pollinia is limited by the viability of the massed pollen grains and the physical endurance of whichever kind of animal carries the pollen. However, the present results suggest that, *within* populations, pollinia are a viable means of dispersing particular genes. We speculate that one advantage for seed settling very close to at least one parent, as in this case, is the increased likelihood of rapid infection by the mycorrhizae necessary for successful germination; these would already exist in the soil surrounding the parent.

Hybridisation evidence supports the recent expansion of the genus *Anacamptis*

Good evidence for maintaining the genus *Anacamptis s.l.* (cf. Bateman *et al.*, 2003), including the *laxiflora-palustris* group, is also provided by a critical survey of records of natural hybridisation across the genus.

The novel hybrid combination reported in this paper is one of several recorded in the literature between *coriophora* or *fragrans* on the one hand and members of the *laxiflora-palustris* group on the other, reflecting their similar geographical ranges, overlapping habitat preferences and similar flowering periods, as well as some remaining degree of genetic compatibility. These hybrids most frequently involve *laxiflora*, probably because it is represented by more populations than the other species, but there also exist good descriptions of *A. coriophora s.l. x palustris s.s.* that, not surprisingly, bear a close resemblance to the plants described here. In addition, hybrids have been reported between *A. coriophora s.l.* and more geographically restricted members of the *laxiflora-palustris* group, specifically *A. pseudolaxiflora* and *A. elegans*. Other suspected partners for the *laxiflora-palustris* group include *A. morio*, *A. papilionacea* and even *A. pyramidalis*.

Broadening the review shows that other hybrids within *Anacamptis* transcend almost equally great molecular disparities (cf. Senghas & Sundermann, eds, 1972; Bateman *et al.*, 2003); the best documented examples are *coriophora* group x *morio* group and the

morio group x *papilionacea*.

Most importantly, the supposedly phylogenetically isolated “original” species, *A. pyramidalis*, has hybridised relatively frequently with most other members of the expanded genus. Reinhard (1972) studied morphometrically a swarm of about 20 plants of *pyramidalis* x *morio* s.s. in southern Switzerland. Hybrid swarms have also been recorded between *pyramidalis* and *papilionacea*, and hybrids are known with the *A. coriophora* group.

Thus, of the six main natural groups recognised in *Anacamptis* (three of which consist of single species), all but *A. collina* participate frequently in inter-group hybridisation, and even *collina* has on rare occasions been romantically linked with the *morio* group, *papilionacea* and the *coriophora* group. The apparent relative isolation of *A. collina* is unlikely to be genetic but rather is more likely due to the fact that it flowers earlier than the other species across most of its geographic range.

Admittedly, rare hybrids occur between species of *Anacamptis* and species of its morphologically and chromosomally distinct sister genus, *Serapias* (Bateman *et al.*, 2003). Illustrated examples of such bigeneric hybrids include hybrids between *Serapias* and *A. laxiflora*, *A. coriophora*, *A. picta* (*morio* group) and *A. papilionacea*, and other examples listed include those with *A. coriophora* s.l. and *A. pyramidalis*.

Convincing evidence is very rare of natural hybridisation between *Anacamptis* s.l. and taxa more phylogenetically remote than *Serapias*. Our scepticism extends to supposed crosses of *Anacamptis* s.l. with species of *Orchis* s.s. and *Neotinea* s.s., which were until 1997 viewed as congeneric with species now assigned to *Orchis* s.s. and *Neotinea* s.l. (e.g. Bateman *et al.*, 2003).

Broader implications

This new hybrid represents a cross between an exceptionally small-flowered species producing nectar and the largest-flowered species in the genus *Anacamptis*, which is completely devoid of nectar. It is clear from this study that even these contrasting pollination syndromes are insufficient to fully preclude exchange of genes between the two species.

My collaborators and I agree with the long-held, mainstream view in systematic botany that records of natural hybridisation give valuable information on the closeness of relationship of the parent species, but we qualify this statement by noting that most such records require confirmation by both morphological and molecular techniques if they are to be judged reliable (Bateman, 2001). The existing literature on European orchid hybrids contains far too many questionable records that collectively exaggerate both the frequency of hybridisation and the size of the evolutionary gap that can be successfully bridged as a result of natural cross-pollination. Indeed, the numerous, largely unsubstantiated records of hybrids between *Anacamptis* s.l. on the one hand and the newly-circumscribed *Orchis* s.s. and *Neotinea* s.l. on the other have consider-

ably blurred what are actually considerable evolutionary distances separating these three genera.

Beyond simply establishing the identities of the parental species, the ability to compare patterns from genes inherited from both parents, such as nuclear ITS, and those inherited from only one parent, such as chloroplast *trnL*, is opening up a potentially highly informative new research field based on maternity and paternity determination. These data alone will allow detailed studies of the amount and direction of gene transfer among orchids, potentially via the study of dispersed seeds or pollen masses attached to pollinating insects. We suspect that such molecular studies will demonstrate that patterns of gene exchange by seed relative to pollinia will contrast strongly within populations relative to those between populations (cf. Squirrell *et al.*, 2001).

Equally, the value of more careful morphological investigations should not be overlooked (Bateman, 2001). These data will be needed not only to improve existing taxonomies but also to explore precise patterns of inheritance of specific morphological characters and character suites, and to determine whether particular novel combinations of characters (or, in some cases, genuinely novel features) in such hybrids impair, enhance or are neutral with respect to their presumed function. Such studies will help to determine whether frequency of hybridisation among orchids, and longevity of the progeny, are controlled by (a) genetic factors, (b) population density/numbers and/or (c) ecological opportunity.

A historical postscript

Lastly, I experienced a strong sense of *déjà vu* upon reading the brief, yet insightful, account of the original discovery at Hérault, France, of *Anacamptis (Orchis) palustris* s.s. x *A. (Orchis) fragrans* by Timbal-Lagrave (1862, pp. 587–9). His short formal description of the hybrid was followed by an equally brief account of how '*Orchis palustris*' could be distinguished from the closely related and (at that time) questionably taxonomically distinct '*O. laxiflora*'.

In the published debate of the southeast region of the Société Botanique de France that immediately followed Timbal-Lagrave's presentation, M. Planchon noted the ample opportunity for hybridisation afforded to the two parental species by their relative frequency and overlapping ecology in Hérault. M. Cosson questioned the wisdom of formally naming F1 hybrids that could subsequently indulge in back-crossing, and in his reply M. Timbal-Lagrave noted the desirability of distinguishing the mother and father of the hybrid in question. M. Planchon explained the value of generating artificial hybrids of known parentage, and M. Timbal-Lagrave responded by stating that the primary goal of his studies was to demonstrate that most orchid species did not originate by hybridisation.

Although molecular technology has over the intervening 140 years greatly improved the quality of our answers, it is clear that the questions addressed by Bateman &

Hollingsworth's (2004) study of the modern *Anacamptis* would appear remarkably familiar to M. Timbal-Lagrave. To risk an increasingly popular "cliché", plus ça change, plus c'est la même chose.

I thank Paula Rudall and Tony Hughes for commenting on the draft manuscript and Natalie Bell for digitising the photographs.

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Ophrys apifera (Bee Orchid) in Ayrshire (VC75)

Brian Laney and Paul Stanley

Historically *Ophrys apifera* (Bee Orchid) has always been exceedingly rare in Scotland, with no recent confirmed records in print. The earliest record in print for *O. apifera* is a 1908 record for Southwick (VC 73) with a voucher at Edinburgh, while Summerhayes, mentions an old occurrence in Lanarkshire (VC77). More recently the first edition of the Atlas of British Flora makes reference to unlocalised records from VC 72, 73, 74, 75, 76, and 77, and there is a 1980 record from Dalbeattie. There are no current records shown in Scotland in the New Atlas of British Flora.

It was thus, with great excitement that a “single” plant of *O. apifera* was discovered on the 18th of August 2003 on an old industrial site in East Ayrshire. The single plant consisting of two stems, had finished flowering and was fruiting profusely. The location has a rich flora including *Epipactis helleborine* (Broad-leaved Helleborine), *Listera ovata* (Common Twayblade) and *Dactylorhiza fuchsii* (Common Spotted Orchid). The plant was growing in coarse grassland amongst *Salix* with the closest associates being Hedge Bedstraw (*Galium molago*), *Trifolium pratense* (Red Clover), *Linum catharticum* (Fairy Flax), *Pilosella officinarum* (Mouse-ear Hawkweed) and *Carex flacca*.



Ophrys apifera at Ayrshire site

Photo: Brian Laney

Geographically the nearest Bee Orchid locations are on the north coast of Ireland, which leads one to speculate that the Scottish plant has arisen from seed blown on the south-westerly winds from Ireland. Generally the location has much open ground and appears suitable for further colonisation by *O. apifera* especially in view of the run of mild winters. It would be exciting if this becomes a biological reality.

In Search of Wild Orchids at Southport

Keith Marshall

Southport on the Northwest coast of England may be the butt of many a music hall

joke suggesting that the tide never comes in at this seaside resort. But, apart from the sea, there is a wealth of botanical interest. Along the seacoast there is a well-established dune system between the River Ribble and the River Mersey estuaries. The dunes run south of Southport to Crosby, just outside Liverpool. Much of the dune system is designated LNR (Local Nature Reserve) or NNR (National Nature Reserve) and part is in the process of becoming SAC (Special Area of Conservation) with National Vegetation Classification being carried out. The Ribble estuary is designated a RAMSAR site as it is important for over-wintering wildfowl and waders. There is much habitat diversity and, reflecting this, a rich flora has developed in the dunes with typical plants such as *Rhinanthus minor* (Yellow Rattle), *Centaureum littorale* (Seaside Centaury), *Eryngium maritimum* (Sea Holly), *Ononis repens* (Common Restharrow), *Blackstonia perfoliata* (Yellow Wort) and many more. The dune slacks particularly are floristically rich and they are also an important breeding ground for the endangered *Bufo calamita* (Natterjack Toad). Dunes are also important habitat for *Lacerta agilis*, (Sand Lizard). Dune slacks are itinerant pools found in the low-lying depressions among the dunes. They fill with water with the autumn and winter rains to depths up to half a metre. During the spring when it is warm and wet the natterjack toads will come and spawn in these slacks. The slacks dry up during the summer and it is because of this that they are important for natterjacks. There is no water for predators to survive in as they would in permanent pools. The dune management tries to keep open these areas where slacks form or have been in the past. These areas quickly grow over with *Salix repens* (Creeping Willow) and *Hippophae rhamnoides* (Sea Buckthorn) which is not only vigorous but fixes nitrogen into the soil thus altering the nature of the soil and ultimately the flora.

Between Southport and Ainsdale a management strategy imposed about 10 years ago has meant changes to the frontal dunes and a build up of new dunes with slacks forming where previously vehicles were allowed to drive along the beach. This area is now quiet and people can walk and enjoy this part of the coast. Parking is available on the beach at Birkdale near Southport and at Ainsdale at the Sands Lake or on the beach, the rest you walk. There is a charge to park on the beach.

I visited one area during the last week of June and the orchids had been in flower for a week or two already; many had already set seed. I would suggest a visit any time in June. The displays of orchids were phenomenal; I recorded four genera: *Epipactis*, *Dactylorhiza*, *Ophrys* and *Anacamptis* in the space of fifty metres after leaving the car. Most of the orchids one sees on the dunes tend to be located near the slacks and are locally prolific. The commonest orchids in the area are *Dactylorhiza incarnata* (Early Marsh Orchid), *D. fuchsii* (Common Spotted Orchid) and *Epipactis palustris* (Marsh Helleborine). Once I got my eye in around the slacks they seemed to be everywhere. In places it was difficult to walk for fear of treading on orchids as I passed. Most of these species were around the edges of the dune slacks where it is always damp. Slightly elevated above the original water level of the now drying slacks *Ophrys*

apifera (Bee Orchid) was to be seen in small groups of several plants. In other places larger groups could be seen, but the most spectacular expanse was no fewer than about 60 specimens.

There are at least ten species in the dune system. In the fixed dune *Anacamptis pyramidalis* (Pyramidal Orchid) and *Op. apifera* (Bee Orchid) are found. In the dune grassland *Orchis morio* (Green-winged Orchid), *Listera ovata* (Common Twayblade), *Dactylorhiza fuchsii* (Common Spotted Orchid) and *D. praetermissa* (Southern marsh orchid) are located. The dune slacks reveal *D. incarnata* (Early Marsh Orchid), Southern Marsh Orchid, Common Spotted Orchid, *D. purpurella* (Northern Marsh orchid), *Epipactis palustris* (Marsh Helleborine) and *Gymnadenia conopsea* (Fragrant orchid). Some of these are scarce and are only to be found by searching and walking from slack to slack, but on a warm June afternoon I can't think of anything better.

The Early Marsh Orchid in Northern Europe

John Haggard

IV – Northern forms, blotched leaves and polymorphism

Plants of *Dactylorhiza incarnata* from the more northerly parts of Scandinavia differ from the southern forms with respect to stature and form. Neuman's northern var. *borealis* was convincingly demonstrated to be synonymous with Schulze's alpine var. *serotina* by the Dutch botanist Vermeulen (Neuman 1909, Schulze 1894, Vermeulen 1947). Var. *serotina* is the more slender stemmed and sparsely leaved dark purple flowered variant that in its more southern outposts is late flowering. In contrast to the more usual situation in the early marsh orchid, the narrow leaves of var. *serotina* are broadest some way up from their base and are more open (i.e. less keeled); the lower blades are less inclined to have hooded tips. Rather than being erect, the leaves are held out more laterally from the stem ("remoted") and the lower leaves do not extend up to the base of the flower spike as they do in lowland fen forms of the species. Many (but not all) northern British and Irish specimens of subsp. *pulchella*, such as the one pictured on page 101 in "The Wild Orchids of Scotland" (Allan and Woods 1993), exhibit similar or intermediate features. This leads to the conclusion that, although subsp. *pulchella* may not in its entirety be deemed synonymous with it, some purple flowered forms from the British Isles share the morphology, if not the late flowering, of continental var. *serotina* (Heslop Harrison 1956, Bateman and Denholm 1985).

Vermeulen also re-classified a Finnish specimen of "*Orchis incarnatus*" from East Bothnia as var. *drudei*, another form originally described by Schulze from Switzerland and Germany. This dwarf form has few, diminutive, short and spreading leaves. Like most of the northern forms, the flower colour is most often purple, but the web site "Den virtuella floran svenska orkidéer" illustrates such a plant with pink flowers from northern Sweden well. The Dutch orchidologist, Landwehr, included pink flowered Scottish forms from Skye in var. *drudei*, and his illustrations show a close resemblance between some Scottish plants and those from Swedish Lapland (Landwehr 1977). In

addition to var. *serotina* and var. *drudei*, dwarf plants of a more typical *incarnata* morphology may be found in the more northerly parts of the Scandinavian peninsula. Vermeulen described “all intermediates” too with reference to the herbarium at Uppsala. This shows that dwarf *incarnata*, var. *serotina* and var. *drudei* are actually no more than snap-shot components in a spectrum of northern forms that almost certainly blends with typical ssp./var. *incarnata* at lower latitudes and altitudes.

The close similarity of the Scottish and Irish specimens (whatever their flower colour) to plants that fall within this *incarnata-serotina-drudei* spectrum indicates that the northern forms from the British Isles are directly comparable to Alpine and Scandinavian plants and, in my opinion, should be looked upon taxonomically as such. The use of the term, subsp. *pulchella*, seems inappropriate for these upland and northern populations which may include morphologically identical plants with pink flowers and sometimes with marked leaves too.

It is not insignificant that Scandinavian and Alpine *incarnata* occur in colonies containing plants with leaves spotted or blotched on one or both sides. Northern Swedish specimens have been described as “northern *cruenta*” or as var. *haematodes* if the blotches are only present on the upper side of their leaves (Landwehr 1977). Greatly subdivided in the past into varieties of the species *Dactylorhiza cruenta*, the overall morphological variation of alpine and northern blotched plants very much mirrors that of the Lapland and montane forms of *Dactylorhiza incarnata*, and it is most likely that they are nothing more than marked and unmarked forms of the same entity. If the northernmost British and Irish plants are more closely related to the Scandinavian and alpine forms than they are to the pink or purple flowered individuals from southern England, then it is hardly surprising that we find variable numbers of plants with pigmented leaves in the northern parts of the British Isles too. Blotched leaves are almost certainly a phenotypic expression of one or just a few genes that are absent in the species over the greater part of our islands and that may offer a selective advantage in a cold, cloudy, northern and/or montane environment.

In southern Sweden and the Baltic islands, a different form of “*Dactylorhiza cruenta*” occurs. Generally quite a large and early flowering plant, “southern *cruenta*” has broad, spreading (blotched) leaves; foliage more robust than and dissimilar to either that of the other forms of *incarnata* with which it grows, or with that of “northern *cruenta*”. Both northern and southern *cruenta* forms grow together on the Baltic island of Gotland (and some other places) where intermediates may also be found. This southern form is undoubtedly absent from Britain and Ireland. The large plants with blotched leaves from the fens of the Burren in south-western Ireland that have been traditionally called subsp. *cruenta* appear to have a fairly typical *incarnata* anatomy and seem to be closer in form to the Alpine *D. incarnata* var. *hyphaematodes* than to the southern Swedish variant.

Hedrén has demonstrated a genetic difference between typical “southern *cruenta*” and



Var. *drudei* forma *cruenta* ? or
subsp. *cruenta* var. *brevifolia*
All Photos by John Hagggar



A purple-flowered EMO from the
same meadow in Mayo consistent
with continental var *drudei*



A purple-flowered EMO from Co.
Mayo with *incarnata*-like leaves



cruenta form with blotched leaves
from Öland

other *D. incarnata* types (including the “northern *cruenta*”) but it appears that the esterase variation he identified is more associated with the broad, spreading leaf form than with the pigmented appearance (Hedrén 1996). Similarly to purple flower colour, leaf and bract pigmentation in diploid marsh orchids is another character that evidently does not necessarily indicate genetic proximity. The Italian orchidologist, Rossi, believes that leaf markings in their own right are so irrelevant as a taxonomic feature in the Alpine forms of *D. incarnata* that he uses the term “*cruenta*” only as a “forma” epithet (Rossi 2002). Malmgren has experimentally crossed plants bearing bilaterally blotched leaves with typical Swedish var. *incarnata* and has shown that the progeny have blotches only on the upper sides of their leaves, making the distinction between var. *cruenta* and var. *haematodes* very tenuous indeed (Malmgren 1992). Many of the Irish colonies of so-called subsp. *cruenta* demonstrate that a similar phenomenon occurs in nature too (Turner Ettliger 1997). Bateman and Denholm believe that too much taxonomic weight has been placed on blotched leaves, and this certainly does appear to be the case. Leaf pigmentation is a further example of an oligogenic character that has been used to elevate and group segregates that might not be especially closely related at all to the undeserved level of subspecies or even species.

Illustrated are pictures of three specimens of purple flowered early marsh orchid from the same damp loughside meadow in County Mayo, photographed at midsummer in 2001. All are consistent with northern and upland forms of *Dactylorhiza incarnata*, as previously described; one is morphologically a dwarf *incarnata* with long hooded leaves, another is characteristically like var. *drudei*, and the third is similar to the second but has bilaterally pigmented bracts and leaves. An older classification of the third plant might have been *Dactylorhiza cruenta* var. *brevifolia*, had it been found in Switzerland or Sweden, but perhaps *Dactylorhiza incarnata* var. *drudei* forma *cruenta* would be a more appropriate description. The shared habitat and similar floral anatomy suggest that these plants are all genetically close to each other despite the differences in vegetative appearance.

Overall, the evidence from the northern, upland and foliage-pigmented forms of *D. incarnata* would support the conclusion that neither the possession of blotched leaves nor of purple flowers in the early marsh orchid is a taxonomically unifying characteristic, and that both the subspecies *pulchella* and *cruenta* as currently defined in the British literature are false groupings that are not monophyletic.

It is reasonable to retain the term var. *pulchella* for those plants that match the form and habitat requirement of the specimens originally described from the New Forest (Druce 1918). Var. *pulchella* is clearly ecologically isolated from other *D. incarnata* segregates in the valley bogs of southern England, but plants of fairly similar vegetative morphology, floral anatomy and colour may be encountered in quite different fen and basic wet meadow habitats further north and west. In some sites they may be found in polymorphic colonies with other apparent forms and flower colours. All such plants would come under the blanket description of var. *incarnata* in Scandinavia and plants

that share many of the features of var. *pulchella* are found in the limestone fens of Öland and Gotland. How, though, should we approach these plants in Britain and Ireland? Are they best considered to be purple flowered var. *incarnata* or var. *pulchella* in atypical habitats? According to Heslop Harrison(1956), plants with all the features of the southern bog plants are only found in a few places in Ireland (habitat is not mentioned) outside central southern England. As previously described, however, many purple flowered specimens elsewhere in the British Isles do not share the vegetative characteristics nor the habitat preference of those plants originally described as subsp. *pulchella* at all, and indeed appear to be more consistent with continental taxa such as var. *drudei*, var. *serotina* and “main-form” Scandinavian var. *incarnata*. The fact that subsp. *incarnata* in Britain and Ireland has been defined locally by many authors to include only pink flowered plants confuses the issue still further. It is utterly unproven that northern, southern and western specimens of subsp. *pulchella*, as loosely defined by Heslop Harrison in 1956, are genetically closer to one another than they are to other flower colour forms. Indeed, recent work by Bateman on the genetics of the species indicates that there is insufficient evidence to separate any British *D. incarnata* segregate at the level of subspecies (HOS meeting Wisley 2003). A return to a nomenclature more akin to that of the 1930’s is long overdue. It is highly doubtful that *D. incarnata* can be split into meaningful taxonomic subgroups on the sole basis of any pigmentation characteristic at all.

In my opinion, the bog adapted purple flowered early marsh orchid in southern England is distinct and is a recently evolved entity. This supposition would offer a reasonable explanation why comparable plants are found elsewhere in alternative habitats and why specifically bog adapted, solely purple coloured forms tend not to be found in most other parts of Europe. Why this might have occurred requires further explanation, of course.

The problem of polymorphism, which was discussed at length by Heslop Harrison, remains the greatest obstacle to a satisfactory sub-classification of *Dactylorhiza incarnata*. The assumption that flower colour is an oligogenic characteristic and in most cases is of little taxonomic value is strongly supported by observation, and I believe this will soon be confirmed by experimental crossbreeding. Despite his decision in 1956 to group all purple flowered plants in subsp. *pulchella*, Heslop Harrison’s earlier works argued that flower colour alone could probably **not** be used to sub-classify the species.

Segregates of *D. incarnata* that are polymorphic for flower colour alone but which exhibit an otherwise common morphology should most properly be referred to the same variety (or subspecies if any *incarnata* segregate deserves that rank). Heslop Harrison (1956) biometrically investigated such a mixed population from Redgrave Fen in Norfolk biometrically and showed that in labellar and spur dimensions the different purple, pink and pale-yellow forms were to all intents and purposes identical with respect to these characters. This evidence surely suggests a close genetic rela-

tionship between the plants in such mixed colour colonies, thus making it unreasonable to refer the plants with differently coloured flowers to different subspecies. Work by the Danish botanist, Pedersen (1998), on a mixed colony of var. *incarnata* (he does not tell us whether they had pink, red, lilac or purple flowers) and var. *ochrantha* in north-western Zealand showed that the allele frequencies for the three allozymes that he measured were extremely similar in the different colour forms. This further supports the inclusion of individuals in monomorphic but mixed colour colonies in the same variety or subspecies. Flower colour alone is best described using “forma”, if it needs such characterisation at all.

The problem of polymorphism extends beyond flower colour alone. There is no doubt that some subpopulations of *D. incarnata* can contain plants with different floral anatomies and general morphologies that in some cases might be linked to specific flower colours. In southern England, a fairly typical morphology can be applied to each of the generally pink flowered fen form of the species and the generally purple flowered bog form but, as discussed earlier, this is a generalization and not a strict separation and it does not hold true over the whole of the British Isles. Looked upon collectively, plants with purple flowers harbour a greater degree of morphological variation than those with flowers of any other colour. In this respect the Scandinavian and British populations are similar, and it probably indicates that purple flower colour is a primitive characteristic or that polymorphic colonies containing purple flowered plants constitute a possible ancestral state. Heslop Harrison (1953) felt sure that *D. incarnata* had already evolved into distinct purple and pink forms before the species re-entered Britain after the last glaciation, but the evidence that I have presented leads me to the conclusion that he was wrong and that flower colour polymorphism is the more ancestral situation. The populations with the greatest degree of anatomical variation in Britain are probably the mixed colour colonies in the fens of East Anglia. These have been inappropriately subdivided in the past, usually just on the basis of flower colour, but sometimes on the basis of robust habit and late flowering.

Heslop Harrison described a remarkable colony of *D. incarnata* from Sutton Broad in Norfolk in his 1956 observations. Nearly half a century ago, the orchids here occurred in two apparent anatomical forms. The smaller, which displayed pink or yellow flowers, was considered to be subsp. *incarnata*. The larger and later flowering form was exceptionally robust with many leaves and individuals averaged not far short of half a metre in height. This latter form, “subsp. *gemmana*”, occurred with pink or purple flowers. So unusual were these plants that Heslop Harrison considered the possibility that they might be representatives of the southern European *Dactylorhiza elata* and not *incarnata* at all. Subsequent chromosome studies on some of the largest plants that were nearly a metre tall, however, elucidated their diploid status and chromosome number of $2n=40$. The plants were indeed early marsh orchids. Similar huge and late blooming purple flowered plants are still to be found as a major component of Sussex’s largest extant colony of the species but I have encountered them nowhere else in this country. In Sweden, of course, *Dactylorhiza incarnata* var. *incarnata* is well recog-

nized as occurring in large, robust and purple flowered forms that bloom at midsummer. Some extremely robust forms, which match the stature of the Sutton Broad plants and occur in similar polymorphic colonies, are identified as var. *latissima* (Mossberg & Lundqvist, 1994). Not surprisingly, var. *latissima* in Öland is invariably purple flowered. To define the robust individuals as yet another subspecies appears quite unwarranted.

I believe these highly polymorphic colonies to be no more than genetically richer segregates of the major temperate-climate form of *Dactylorhiza incarnata*. This is the type, the fen form, subsp. or var. *incarnata*, which usually has pale pink flowers in England and a flowering period in late May and early June. This plant occupies the optimum habitat for the species, namely neutral to alkaline wet meadow and fen. In Öland and elsewhere in Scandinavia, the same apparent pink flowered form can be found in the same habitat flowering at the same time. Unlike the usual situation in England, however, plants of this colour and form are often components of a highly polymorphic population complex whose various members flower over a much-extended period until late July. The usual flower colour of this complex is purple, not pink. Red and yellow pigmentation is almost certainly present, albeit obscured, in most of the plants that contain purple anthocyanins in strong concentrations. The rare polymorphic colonies of southeast England fall mid-way between the “typical” southern English presentation of subsp. *incarnata* and that of subsp./var. *incarnata* as understood in Öland and elsewhere in Sweden. Major differences on our side of the North Sea appear to be the **rarity** of purple pigmentation, the **restricted** flowering period and the **paucity** of morphological variation. In addition, *D. incarnata* tends to be a rather rare plant in suitable British habitats, whereas in Sweden it may be locally very common where environmental conditions are optimal. All these points are in my opinion connected, and the true relationships of the various British and Scandinavian forms of the species can only be properly understood if we can answer the question of why these differences occur.

A full list of the references quoted and additional illustrations may be found on the author’s website at www.johnsorchids.co.uk.

A Year in the Lot - Orchid Hunting in South West France **Sheila Tucknott**

Our adventures in France started in April 2002 when my husband, Gary and I crammed the last possessions from our home into our car and headed south. We were chasing a complete change of lifestyle and our furniture lorry which already had a 36-hour head start. Ahead of us – a new home in South West France and the daunting task of converting our large stone barn into a Chambres d’hôtes (bed and breakfast) in time to open for the summer holiday season.

Our adventures with orchids started just a few days later when we emerged from

unpacking to take an evening stroll across the fields. We found wild flower meadows studded with Sage, Scabious, and Cowslips. and glimpsed the first flowers of the *Orchis mascula* (Early Purple Orchid). Two weeks later the view across the hayfields was transformed into a haze of purple as the sheer abundance of the early purple orchids became apparent. I knew that the climatic and geographical conditions in the Lot made this a prime location for wild orchids to flourish, but I was quite unprepared to find them growing like weeds in my back garden!

Our house called the Mas de Guerre is situated in the southern tip of the Lot department where it borders the Tarn and Garonne to the South, and the Aveyron to the East. The Lot is dominated by two arid limestone plateaux, the Causse de Gramat and the Causse de Limogne, which are about 300 metres above sea level. The soil is very poor and there is little crop cultivation except fruit and tobacco growing in the valleys of the Lot and Célé rivers. Most of the farmers here derive an income from keeping small herds of dairy and beef cows; and grassland management is kept to a basic level, using very few chemical fertilisers and herbicides. The nearest industry is over 80 kilometres away in Toulouse, and consequently the air is clean and unpolluted which makes for clear night skies. We have a Continental climate, with hot dry summers and cold winters, occasionally tempered by the Atlantic climate from Bordeaux which tends to bring rain and milder weather.

That year we felt we had a bit too much interference from the Atlantic, in fact it poured with rain throughout the spring and summer months. We were assured this was very unusual! We watched the tall, stately blooms of the *Orchis purpurea* (Lady Orchid) appear in the field margins, in May and noted the last of the *Himantoglossum hircinum* (Lizard Orchid) disappearing in mid-July. As the flora gradually changed around us we learnt a little about the history of the Mas de Guerre from our neighbours. The house was originally part of a large farm of about 40 hectares with mixed usage: sheep, goats and vineyards producing the famous black wines of Cahors. Unfortunately, phylloxera destroyed the vines in the 1870s and the vineyards were removed and replaced with plantations of oak, grown for both their wood and their truffle-growing potential. The last farmer to own the house died 30 years ago and since then most of the land had been abandoned except for 3 fields which have been regularly cut for hay in mid-June. Thus we have a variety of



Orchis purpurea in the Lot
Photo: Gary Tucknott

different habitats: oak woodland, hay meadows, former vineyards and unused grasslands where the bedrock of the Causse de Limogne protrudes through the sparse, red topsoil. We had a wet, mild autumn and noticed the first orchid leaves appearing in December. But January proved to be very cold, and temperatures plunged to minus 16 degrees – we were assured this was very unusual! In the short days of the New Year, Gary and I looked forward to Spring and planned some very basic research on our wild orchids. We had 4 questions we hoped to answer:

What are the wild orchid species present at the Mas de Guerre ?

When do they flower?

What is their relative abundance?

What other orchid species are present in the locality ?

We planned to undertake weekly counts of orchids in flower within 14 measured plots of land totalling about 10 acres (4 hectares). Our fields are clearly defined by dry stone walls and these concur with the cadastral map. We chose a variety of different habitats to study (woodlands, hayfields, meadow, scrub etc) and were careful to include both fields which had been grazed by our horses and those which were still virtually abandoned. We also used our previous observations of flowering orchids from Spring 2002 to select the areas where we hoped to identify the greatest diversity of species. We spotted our first orchid – an Early Purple – on 5th April 2003. The next day (Sunday 6th April) we undertook the first of our weekly orchid counts and found a total of 4 plants in two separate plots, and noted both varieties with spotted leaves and unspotted leaves. Two weeks later the number of Early Purples had risen to well over 1,000 plants, and the counts were taking up most of Sunday and Monday too! Also that week we found 20 Lady orchid plants with colours varying from salmon pink \white to a deep purple. By the end of April the Early Purple numbers had risen to over 2,000 but we were rewarded for our efforts and found two dainty little *Orchis simia* (Monkey Orchid), the delicately scented *Orchis ustulata* (Burnt tip Orchid) – both in rocky, west facing fields – and the first *Anacamptis pyramidalis* (Pyramidal Orchid). I nearly trod on the first specimen of *Ophrys scolopax* (Woodcock orchid) which we discovered in a former vineyard and also noted the leafless blooms of *Limodorum abortivum* (Violet Limodore) in an oak woodland. On 25th May we



Neotinea ustulata in the Lot
Photo by Gary Tucknott

noted the first flowers of *Himantoglossum hircinum* (Lizard Orchid) appearing perhaps 4 weeks earlier than the previous year and the second *Ophrys* species – *Ophrys apifera* (Bee Orchid), also flowering earlier than 2002. We completed our counts on 15th June but noted the dying flowers of *Epipactis helleborine* (Broad-leaved Helleborine) on the edges of the oak woodland in early July, and also the bright pink flowers of *Cephalanthera rubra* (Red Helleborine) whilst out horse riding on the *Causse* – but unfortunately none in the grounds of the *Mas de Guerre*. The results of our counts are summarised below.

Orchid species	Flowering period (2003)	Peak abundance	
		Number	Date (2003)
<i>Orchis mascula</i>	5th April – 25th May	2,175	27th April
<i>Orchis purpurea</i>	20th April – 11th May	41	27th April
<i>Orchis simia</i>	27th April – 11th May	2	4th May
<i>Orchis ustulata</i>	27th April – 25th May	52	11th May
<i>Anacamptis pyramidalis</i>	27th April – 10th June	410	25th May
<i>Ophrys scolopax</i>	4th May – 10th June	18	18th May
<i>Limodorum abortivum</i>	4th May – 25th May	10	18th May
<i>Himantoglossum hircinum</i>	25th May – 10th June	75	10th June
<i>Ophrys apifera</i>	25th May – 3rd June	3	3rd June
<i>Epipactis helleborine</i>	Present but not known		

Our attempts to compile a list of orchid species present in the locality have been greatly aided by many neighbours and friends who have been intrigued and bemused by our Sunday morning activities. One couple have been keen orchid hunters and photographers for several years and have observed an additional 12 species within easy walking distance, including *Ophrys insectifera* (Fly Orchid) and *Serapias lingua* (Tongue Orchid). We also visited the central office of the Quercy Regional Park at Labastide-Murat, and they kindly provided us with a list, which included the more unusual orchids within the Park. See our website for this list <http://www.masdeguerre.com>

We identified a total of 10 orchid species within the fields and woods of our house, with the peak time for diversity of flowering species between late April and late May. This information is very useful to us to plan haymaking and field grazing for the horses to minimise disturbance to flowering orchids. We have also noted a difference (of about 4 weeks) in flowering times between 2002 (which was cool and wet) and Spring 2003. This year we had no significant rainfall between February and September and very high temperatures of over 35 degrees from June to August - very unusual! We were pleased with the (perhaps modest) number of orchid species we found at the Mas de Guerre, particularly as we know that a further 12 species are present on our doorstep, within easy walking distance. The Quercy Regional Park and Aveyron val-

ley offer a further 22 species, some exceptionally rare.

Will we be counting again next year? Yes, but restricting the number of fields for the weekly counts so that we can devote more time to exploring the rest of our land (we have about 20 acres in total) and further afield in search of other orchids. With 45 wild orchid species in the locality no doubt we will be very busy.

Orchid Photography

Tony Hughes

Introduction

Orchid photography is a very important aspect of HOS members' activities which has been discussed a few times at our meetings, but no-one has yet had the courage to write about it - until now! There are so many excellent photographers in our society that I am probably laying myself open to ridicule (but that is something I am well used to). Very little (if anything) of what I say will come as news to the experts, but I shall be delighted if members with less photographic experience are encouraged to experiment and are helped to produce more spectacular pictures.

Photography is a vast subject, but I shall limit myself to discussing some of the things one should consider when standing outdoors, camera in hand, faced with a load of orchids. Taking the class specifications of our annual photographic competition as a guide, the plan is to produce three articles: the first on "close-ups", the second on "the whole plant", and the third on "orchidaceous landscapes".

I shall deliberately avoid any discussion of the relative merits of "film" or "digital" cameras. My own experience is entirely with celluloid, but most of the issues I shall raise apply equally to both - it is just the numbers that are different. Perhaps someone else will be encouraged to write about the differences?

Part 1 - Close-ups

The Objective here is to get the lens so close to the plant that the frame is almost filled with the selected flower(s) or flower spike, and all is perfectly sharp. This may sound simple, but there are several factors that conspire to make life difficult!

The Right Equipment can make life much easier. A "Single Lens Reflex" camera (SLR) is my preferred choice, because the viewfinder shows exactly the view that will appear on the film. Many years ago when I started taking close-ups, my camera lens would only focus down to about 18 inches - not very close! In order to take real close-ups I had to insert extension tubes between the camera body and lens. The results were fine, but it was a tedious business to select the right extension tubes and join all the bits together. Nowadays lens technology has improved enormously and things are much easier. Many zoom lenses offer a so-called "macro" facility, whereby the image on the film can be as large as one third or even one half life-size. This is quite adequate

for the majority of orchid close-up requirements. However, I sometimes want to get even closer, and investment in a proper macro lens really changed my life. In most respects this type of lens, which in my case is of 50mm focal length, functions just like a standard lens. However, the focus adjustment allows very close focusing, resulting in images on the film as large as life-size. The only problem is the cost!

The Subject is the most important aspect, so it is sensible to inspect all the available-orchid specimens with a very critical eye.

While doing this, please take great care to avoid trampling on plants; it is a sad reflection on the enthusiasm of orchid photographers that plants (especially non-flowering ones) at popular sites often suffer a great deal of damage. Look for fresh young specimens that are of good colour and completely undamaged. Avoid those that are dusty, and carefully remove those tiny bits of cobweb that are almost invisible to the casual glance but are so obvious in the final picture.

Composition of the picture gives you endless possibilities. I well recall Paul Davies several years ago mentioning that a succession of perfect pictures of single *Ophrys* flowers, all viewed face-on, rapidly gets boring. So, as in a certain other branch of photography, don't overdo the "full frontal" approach, but experiment with different poses. Try some shots sideways-on or at an in-between angle.

Try including the buds at the top of the spike, or putting two or three flowers in the frame. Finally, make sure that your composition is tastefully centred (both "top-to-bottom" and "side-to-side") in the frame, that it isn't leaning drunkenly to one side, and that the dead flowers at the bottom of the spike cannot be seen.

"Depth of Field" describes the distance between the furthest and nearest points from the camera that are in focus. For a given focal length of lens, depth of field reduces as the lens is focused closer in, but increases as the lens is "stopped down" to smaller apertures. Consequently, as the camera is moved closer to the subject, progressively smaller apertures are needed to obtain adequate depth of field. For extreme close-ups, it may be necessary to stop the lens down towards its minimum aperture, e.g. f/16 or f/22. Some cameras provide a very useful "depth of field preview" button. When this



Spot-the-errors picture
Tony Hughes

button is depressed, the lens aperture closes to the pre-set value and the viewfinder shows exactly what will appear in sharp focus on the film.

Focusing for close-up work is extremely critical. In order to make best use of the limited depth of field available, one might be tempted to focus mid-way between the nearest and furthest parts of the flower. This works only if the depth of field is large enough to get the entire depth of the subject in sharp focus. However, if the depth of field is not quite big enough, both the nearest and the furthest parts of the flower will be blurred. While the eye may not worry too much about the slightly blurred tip to the furthest petal, it is much more sensitive to any blurring in the foreground. Consequently, a more satisfactory picture may result from focusing a little towards the front of the flower. The depth of field preview button is again invaluable! With autofocus lenses it is often more convenient to turn off the autofocus function and adjust it manually. This is particularly significant when taking pictures near 1:1 magnification, where the camera must be moved physically back and forth to bring the subject into focus.

The Background and Foreground can also be checked at this point. In close-up pictures, any foreground object closer to the lens than the subject will produce a big, distracting blur, so should be bent out of the way. The background will normally be out of focus, producing a mottled pattern of light and shade. However, colourful or shiny objects in the background, such as buttercups or lengths of dead grass, may appear as distracting highlights; these are best eliminated. Once again, the depth of field preview button allows you to see exactly how things will appear on the film.

A Sharp Picture of a correctly focused scene will be achieved only if both camera and subject remain absolutely still during the exposure time. Unfortunately, everything is conspiring against you! Small apertures necessitate long exposure times; the high magnification of the subject means that even the tiniest movement is significant; orchids frequently grow on tall bendy stems and the wind rarely stops blowing! To reduce movement of the flower, try providing some support to its stalk. I sometimes carry a metal rod with one end sharpened to push into the ground and the other end hooked to cradle the flower stalk. However, a couple of dead sticks from a handy shrub can be equally effective when touching the stem as closely below the bottom of the field of view as possible. Then improvise a wind-break - an umbrella or an article of partner's clothing might do. But be careful - I once got some very strange looks when some passers-by heard me ask Diana to break wind for me! Keeping the camera still is also tricky, since few people can reliably avoid detectable movement in exposures longer than 1/100th of a second. A stable tripod capable of supporting the camera close to the ground is the best solution, particularly if the shutter can be operated remotely through a cable release. However, not everyone is sufficiently dedicated to carry heavy metal around all day, so alternative dodges may be needed. There is rarely any alternative to getting down on all fours, elbows on the ground, and holding the camera with both hands. A stout stick gripped against the camera body with its other end on the ground

then completes a somewhat wobbly tripod. I admit that crawling around in a bog may not be everybody's idea of fun, but any sacrifice is justified if a good orchid picture results.

A Flash-gun changes things completely since it is capable of freezing the motion of both camera and flower, and it lets you take "sunny" pictures during a cloudburst or in the depths of a wood. Note, however, that you still have to get the subject accurately in focus. The simplest approach uses the little pop-up flash unit built into most modern cameras. Unfortunately, this may not work for the closest shots, because it may generate a shadow of the lens across part of the picture. This shadow can usually be avoided by mounting a removable flash-gun on the "hot shoe" on top of the camera. A rather expensive solution is a "ring-flash", mounted near the front of the lens, but the uniformity of illumination so produced often results in bland, featureless pictures. My own preference is to use a flash-gun coupled to the hot shoe by a yard of flexible cable; the flash is then held as far from the subject as possible at an appropriate angle to simulate natural sunlight: this is much easier if you have three hands! Some people complain that the rapid fall off in flash illumination behind the subject causes such dark backgrounds that the pictures look unnatural. However, the use of the "remote" flash-gun can significantly reduce that effect. Remember, if your camera requires you to perform calculations on the intensity of flash illumination, it is the "flash to subject" distance that is relevant, rather than the "camera to subject" distance. For really professional results you might consider using either a reflector or a second, low-power flash-gun to lighten the shadows produced by the main flash.

Finally, when the wind has dropped and the sun has reappeared, press the shutter release. Then take another one or two for luck. If you have attended to everything mentioned above, your bored companions will have vowed never to accompany you again and you will probably have missed lunch, but you might have a prize-winning picture!

I considered illustrating this article with a perfect picture, but then thought it would be more fun to take a terrible one so that you could spot the faults. If you can list more than 10 faults, you should have written this article - but if you can't see anything wrong, perhaps you should sell your camera!

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