

Wild orchids of SE England

A FSC course held at the Juniper Hall Field Centre and led by David Streeter.
10-12 June 2011



**Report by
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All Photographs are the authors own.

Introduction

I have had an interest in native hardy orchids for several years, and have wanted to increase my knowledge about their ecology and biology, with the view of using this knowledge to encourage their establishment in a naturalistic garden setting. I have also wanted to learn more about the identification of the different species as many look very similar such as the *Dactylorhiza* species. This is the first part of a report on two field courses, the first on the orchids of South East England, and the second on the orchids of Scotland. This report covers the first field course which was based at the Juniper Hall FSC centre on Box Hill near Dorking. Unfortunately I was unable to attend the second field course in Pitlochery due to illness, but will be attending it in 2012 instead, after which I will write part two of this report.

The field course consisted of a mix of short evening lectures giving a little background on the biology and ecology of orchids, and a series of field excursions to see the different species growing in their natural habitat, together with looking at any other interesting flora we came across.



David Streeter with Juniper Hall FSC in the distance.

The Natural History of Orchids

Worldwide the Orchidaceae family, with between 21,000 and 27,000 accepted species, is one of the largest (if not the largest) plant families. In Britain there are 56 native species of orchid, all of which are terrestrial, some small and hard to spot such as the Bog orchid (*Hammarbya paludosa*), and others that are taller and more colourful such as the Green-winged orchid (*Anacamptis morio*). They range from those that are found growing throughout most of the British Isles, such as the Common spotted orchid (*Dactylorhiza fuchsii*), to those that are rare and only found in a handful of locations, such as the Ghost Orchid (*Epipogium aphyllum*).

The name Orchid comes from the Greek word *orchis* meaning 'testicle', and refers to the shape of the underground tubers of some species. It was first used by Theophrastus (c. 370-285 BC), who is considered to be the father of botany, in his *Natural History of Plants*.

Although there is great diversity in British orchids, they all share certain characteristics:

- They are perennial herbs, lacking any woody parts;
- Their leaves are simple, not divided into lobes or smaller leaflets;
- The leaves do not have a stalk and are arranged alternately along the stem;
- The inflorescence is a single spike at the tip of the stem;
- They have an inferior ovary;
- The male and female parts of the flower are fused together to form a single structure, the column, in the centre of the flower;
- The flowers are resupinate, i.e. upside down as a result of either the pedicel or ovary having twisted.
- The flowers consist of three sepals and three petals, with one of the petals having been modified to form the lip which often has a distinct colour, shape and pattern to it.

British orchids are mainly deciduous, with some exceptions being parasitic or semi-parasitic. They perennate by means of rhizomes or tubers. In the case of tubers, the previous years tuber will feed this years tuber. Most tuberous orchids do not reproduce vegetatively whereas those that are rhizomatous do.



Dactylorhiza fuchsii (a cultivated plant used for demonstration)

The new tuber which will perennate and give rise to growth next year.

Last years tuber giving rise to the vegetative parts and feeding the new tuber.



Orchids and Fungi

The seeds of orchids are dust like, weighing about 1millionth of a gram each, and can be viable for up to 10-15 years. Each orchid will produce thousands of seeds, for example *Dactylorhiza fuchsii* can have up to 17 seed capsules per plant with around 3,200 seeds per capsule. The benefits of producing so many tiny seeds is that they can be dispersed over a very wide area by the wind. Their small size however also has a downside in that the embryo has no food reserves within the seed and therefore orchids have had to evolve another mechanism to feed the embryo.

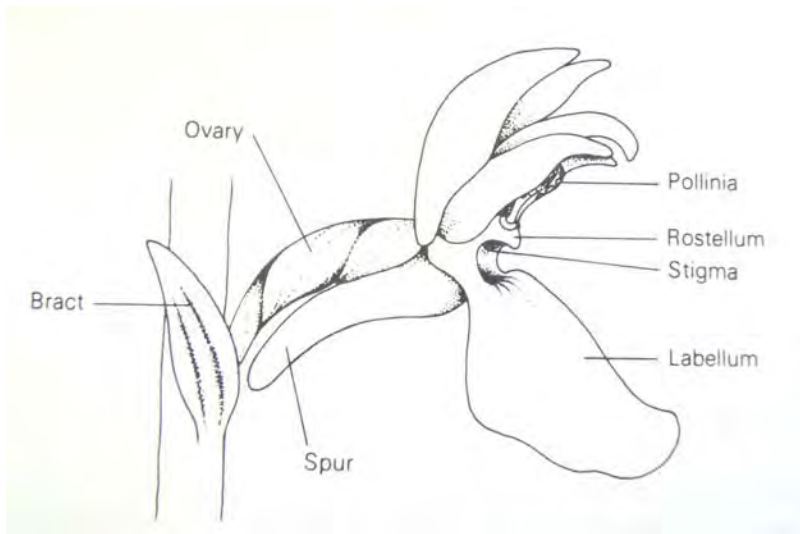
This mechanism was the formation of an association with fungi, known as mycorrhiza. The association begins when the seed germinates to form a subterranean tuber known as a *protocorm*, which is mycotrophic and completely dependent on the fungus for it's nutrition. The seedling remains underground and dependent on the fungus until it is large enough to develop it's first true leaves above ground. The duration of this stage varies from a matter of months to years. Although the mycorrhizal association is essential for germination success, it is not always required once the orchid has developed leaves and established, and the degree of dependence in adulthood varies greatly between species.

Some species become largely independent of their mycorrhiza once they are able to photosynthesize, whereas a few others remain wholly dependent on the mycorrhiza for nutrition throughout their lives as they do not possess chlorophyll to enable them to photosynthesize. The majority of British orchids however fall somewhere between being wholly dependent and independent of the fungi, able to generate their own food but utilising the mycorrhizal association as a source of food at different times when needed. This ability to utilize two sources of nutrition is thought to be the reason why many orchid species are found thriving in marginal habitats such a poor soils and heavy shade. It is also the reason why orchids are able to become 'dormant' and survive underground for a year or longer, disappearing and reappearing populations are often observed amongst orchids.

Unlike other mycorrhizal associations in the plant world, where both fungus and plant host benefit from the association, those formed with orchids differ fundamentally in that the fungus does not receive any nutrients from the orchid, the relationship is one-sided. The few species that are entirely dependent on their fungal partners for nutrients, Bird's Nest orchid (*Neottia nidus-avis*) and Coralroot orchid (*Corallorhiza trifida*), form slightly different associations with ectomycorrhizal fungi that are also in association with trees from which the orchid ultimately derives it's nutrition. A few other woodland specialists such as Red Helleborine (*Cephalanthera rubra*), White Helleborine (*Cephalanthera damasonium*) and Broad-leaved Helleborine (*Epipactis helleborine*), have also been shown to form associations with ectomycorrhiza.

The fungal species specificity varies between orchid species, with some able to form associations with a range of different fungal species, and others only able to form associations with specific fungal species. This specificity can be solely at the germination stage with the adult being less specific, or it can extend to the adult too. The greater the specificity, the more limitations there are likely to be in where the species can grow as it will depend on the presence of the specific fungus too. It is likely that those species of orchid that are rare may be restricted because the fungi they form associations with are also rare and localised.

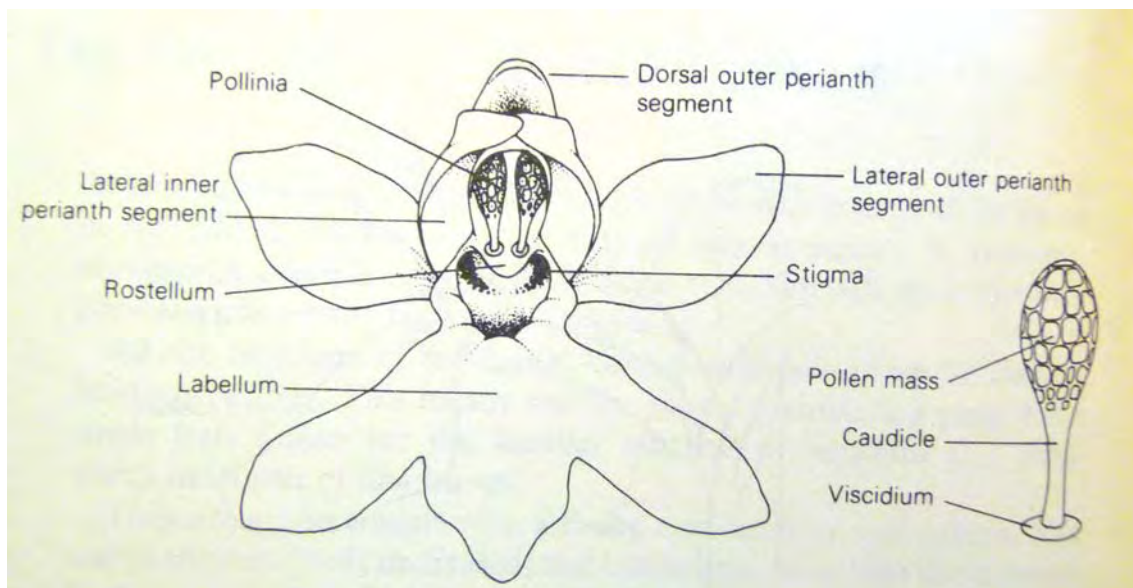
Flower structure and Pollination



(Taken from Lang, 1989)



Although not obvious at first glance, the flowers of orchids are actually upside down, and looking at the flower from the side it is possible to see the twisted ovary or pedicel. An orchid flower e.g. *Dactylorhiza* spp. has three sepals and three petals, with one petal forming what is known as the 'lip' at the bottom, a landing platform for pollinating insects. Many, but not all, orchid flowers have a spur which forms an extension at the back of the lip, this is where the nectaries are positioned, those with very long spurs are pollinated by moths or butterflies.

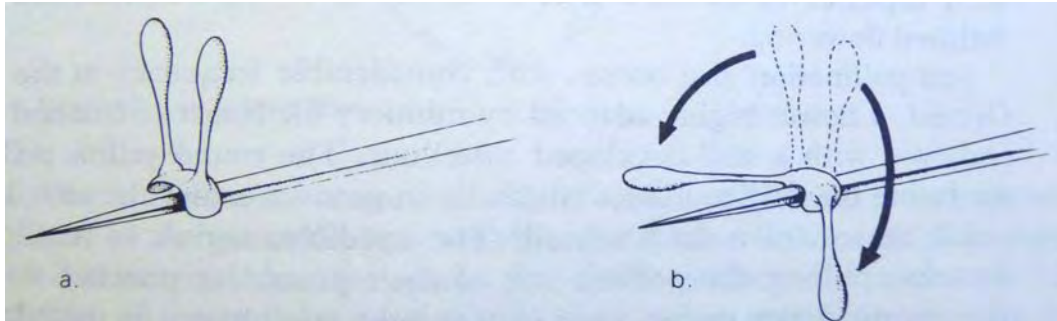


(Taken from Lang, 1989)

Generally there is only one stamen remaining from the outer whorl, and the anther is 2-lobed with sticky pollen which is held together with minute elastic threads. The style has disappeared, so that the three stigma now sit on top of the ovary, and of the three, only two are fertile, the infertile one is known as the *rostellum*. The rostellum acts as a barrier between the anthers and the fertile stigma to prevent self-pollination. These sexual parts form a column which sticks out above the bottom lip.

As the pollinating insect lands on the lip and moves towards the back and the nectaries, it will brush

against the anthers which detach and stick onto the head of the insect. The anthers consist of two parts, the pollinia and the caudicle, at the base of which is the viscidium which attaches to the insect. Once the caudicle has attached to the insect it rotates itself by 90° so that when the insect visits the next flower, the pollinia is in the correct position to make contact with the stigma and pollinate the flower.



Movement of detached pollinia of the Pyramidal Orchid (*Anacamptis pyramidalis*).
(Taken from Lang, 1989)

Both cross-pollination and self-pollination occurs amongst orchids, with many having mechanisms in place to avoid self-pollination if possible, but allowing self-pollination if cross-pollination does not occur. Those that are cross pollinated rely on insects as pollinators. Many orchids have flower structures that have co-evolved alongside their insect pollinators, resulting in many relying on specific insects for cross-pollination. The insects are attracted by the colour, scent and the promise of food in the form of nectar or pollen. However the visiting pollinator is not always rewarded, and some species even use mimicry to trick the insect. We came across several different pollination strategies used by orchids during our excursions.

Some orchids such as the Pyramidal orchid (*Anacamptis pyramidalis*) have guide ridges along their lip to guide and align the pollinating insect towards the nectaries and consequently the pollinia. They are pollinated by moths and butterflies which are attracted by the strong red colour of the flowers and scent, and are able to reach the sap along the inside of the spurs with their long proboscis. The pollinia are in pairs and attach to the proboscis of the insect, shortly after the viscidium contracts and winds around the proboscis pushing the pollinia apart, they then rotate forward so that they are in the correct position to touch the stigma of the next flower. The same mechanism is also employed by the Fragrant orchids (*Gymnadenia sp.*), Marsh and Spotted orchids (*Dactylorhiza sp.*).



The detached pollinia of *Dactylorhiza fuchsii* which gradually bend forwards into position.

The Common Twayblade (*Neottia ovata*) is pollinated by small flies and parasitic wasps which are attracted by its scent. The insects follow a nectar filled groove along the centre of the lip, up towards the rostellum. The lip itself is in two sections, with only half extending outside the flower, the other half reaching inside. The pollen is released onto the rostellum whilst the flower is still in bud, it prevents the pollen from touching the stigma and therefore prevents self-pollination. Once the flower opens, the rostellum puts a dab of glue onto the head of a pollinating insect as it visits, onto which the pollen sticks. Once the pollen has been collected by an insect, the rostellum rises up to expose the stigma ready for the next insect that comes in with pollen..

Some of the Helleborine orchids (*Epipactis sp.*) have a much reduced rostellum which is unable to prevent pollen from falling directly onto the stigma, they are therefore often self-pollinated, sometimes whilst still in bud.

Some orchid flowers use mimicry to attract their pollinators. Insect mimics have evolved to give themselves an advantage as they don't have to compete to be pollinated like generalists but rather only need to attract a particular insect. It is the male insect that is attracted because the flower mimics the female. A scent is also produced that mimics the pheromone of the female. The Bee orchid (*Ophrys apifera*) in the UK however is always self pollinated because its insect pollinator didn't make it over from mainland Europe at the same time as the orchid. Its pollinia are on long stalks which gradually elongate until they are in front of the stigma. A gentle breeze is then enough to blow them onto its sticky surface. The Fly orchid (*Ophrys insectifera*) is another insect mimic, even mimicking the sheen on the folded wings of its bee pollinator.



The pollinia dangling next to the stigma in *Ophrys apifera*.



The white 'sheen' mimicking the wings and narrow protrusions mimicking the antennae of a fly in *Ophrys insectifera*.

Conservation of British Orchids

Orchids in the UK are in decline, with some species becoming particularly rare, or even being recorded as extinct. Habitat destruction and habitat change are the major reasons for this, but collectors, both past and present, illegally removing plants, photographers, botanists and visitors trying to get a closer look, all contribute to the decline.

Some of the rarities:

Previously the Monkey orchid (*Orchis simia*) was only found at three sites in the UK, one in Oxfordshire and two in Kent. It is now also to be found in flower at Park Gate Down in Kent, 8 years after seed was sown on the site, although it may have appeared earlier without flowers. Thus when sowing orchid seed it can be difficult to determine whether it has been successful as it can take many years for anything to happen above the soil surface.

The Lady orchid (*Orchis purpurea*) is only to be found in Kent.

The Military orchid (*Orchis militaris*) was thought to be extinct in the UK, but was rediscovered by an amateur botanist in 1947, although he would not reveal its location. It was then found by Francis Rose and Richard Fitter at Homefield Wood, Buckinghamshire, a forestry commission site which has since been managed to protect the species and consequently the numbers have increased. The orchids were protected by cages as orchids tend to attract people and worn paths leading to and from them lead to compaction of the soil and the resulting drainage problems can damage the plants and result in less plants establishing around them.

The Lizard orchid (*Himantoglossum hircinum*) has spasmodic appearances, e.g. in the dunes at Sandwich Bay.

The Early Spider orchid (*Ophrys sphegodes*) has been studied by Mike Hutchins at Castle Hill in Kent for many years, and its population dynamics are the most studied in the UK. It grows in old chalk grassland, but the largest population is growing on the spoil from the channel tunnel, which is not old. Thus proving that orchids don't only grow on old sites but can establish on new sites provided the conditions are suitable.

Other rare species are:

- Bog orchid (*Hammarbya paludosa*) which as the name suggests grows in bogs. Its flower has turned the right way up and so the lip stands up. It has two pairs of leaves that often have bulbils along their margins, a form of vegetative propagation.
- Green winged orchid (*Anacamptis morio*) has striped sepals and used to occur in its thousands. However it has become scarce because the old meadows it grew in have also become more scarce. Old Victorian churchyards are often good sites as they were often created on the sites of old meadows. Marden meadow in Kent is a good site.
- Burnt tip orchid (*Neotinea ustulata*) is mostly found in the Cotswolds, its inflorescence looks like it's been singed.
- Narrow-lipped helleborine (*Epipactis leptochila*) is found only in the South.

What is being done?

The Sainsbury Orchid Conservation Project (SCOP) was established in 1983 by Kew to carry out research into the propagation of orchids with the view to reintroducing some of the rarer species

into the wild at existing sites with populations and new sites.

The Lady's slipper orchid (*Cypripedium calceolus*) is the second rarest orchid in the UK (the Ghost orchid, *Epipogium aphyllum* being the rarest), almost disappearing because of Victorian collectors and botanists collecting herbarium samples. It was thought to be extinct, but a single plant was rediscovered in the Yorkshire Dales (Park Wood, Wharfedale) in the 1930s. The SCOP put in a lot of money to save it. Seed pods were collected from the plant, half of the seed was spread around the existing plant and the rest took to Kew to culture. As the required fungus was unknown, it was necessary to germinate the seed without it by applying nitrogen in an organic form. Kew only succeeded when under-ripe seeds were tried. Now there are plenty of seedlings being produced, but there are difficulties in transferring the seedlings from culture to establishing them in the wild. They have now been successfully established in 2-3 sites, but there are still problems with the genetics as they originate from the same plant. There are a couple of existing plants in gardens that are known to have originated in the wild and therefore it will be possible to use these to cross-pollinate and increase the genetic diversity.

Wakehurst Place in Kent have been carrying out research as part of SCOP, to see whether orchids can be cultivated in a garden environment, to determine whether this could be another tool in the conservation of species. They introduced the Loose-flowered orchid (*Anacamptis laxiflora*) from Jersey, where it grows naturally (not native to the mainland), into an area of the garden to see whether it would spread from the garden. A few years after the introduction a Tongue orchid (*Serapias lingua*) appeared amongst the Loose-flowered orchids, it also a non-native to the mainland but found on Jersey, and this species has rapidly spread.

Field excursions – Day 1

The flowering season this year is generally two weeks ahead, and because of the prolonged hot, dry weather, the orchid flowers aren't lasting as long as they would normally, so David warned us that we might not see quite as many orchids in flower as we might expect to see at this time of the year.

Box Hill, Surrey (National Trust).

Box hill in Surrey is well renowned for it's wealth of flora and the diversity of orchids that grow there are one of it's specialities. The diversity is down to the variety of soils, topography and habitats found on Box Hill. The soil is predominantly thin and alkaline, low in nutrients and free draining, however there are woodland areas towards the top of the hill where the soil is more acidic. The varying topography gives rise to sheltered valleys, cooler north-facing banks and hot south-facing banks. The habitat ranges from chalk grassland with both short and long swards, through scrub to woodland. We explored a range of habitats on Box Hill, searching for a range of orchids, and any other interesting examples of it's diverse flora.

Our first plant was not an orchid but rather some very rare Green Hounds Tongue (*Cynoglossum germanicum*) that had grown from seed David had sown 40 years ago! The seed had been collected from a small population before it disappeared and sown in this secret location at the margin of a footpath. We spotted both seedlings (right) and mature plants that had set seed (below). It is the seed that give the plant it's common name. This was the first time David had seen mature plants at this location.



Green Hounds Tongue
(*Cynoglossum germanicum*)



Further up the path in an area of woodland we were shown an example of the Spurge Laurel (*Daphne laureolus*) (below), a plant I recognise from cultivated varieties.



Spurge Laurel
(*Daphne laureolus*)



White Helleborine
(*Cephalanthera damasonium*)

We then came across our first orchid of the day, the White Helleborine (*Cephalanthera damasonium*), but disappointingly they had already finished flowering so we only saw the unripe seed capsules and foliage. These orchids are usually self-pollinated even before the flower opens.

The White Helleborine (*C. damasonium*) and Broad-Leaved Helleborine (*Epipactis helleborine*) can be difficult to tell apart when not in flower, however one distinguishing characteristic is that the Broad-Leaved Helleborine has papillae, very small 'bumps' along the margins of it's leaves, whilst the White Helleborine does not.



Leaves of Broad-leaved and White Helleborine side by side.



Papillae on the leaf margin of Broad-Leaved Helleborine (*Epipactis helleborine*), not very clear here but visible under the eye lens.



Common Whitebeam (*Sorbus aria*)

Moving out from the woodland area and into one of the many areas of chalk grassland on Box Hill we spotted a Common Whitebeam (*Sorbus aria*) and Buckthorn (*Rhamnus cathartica*) growing.

Alongside the path, in amongst the scrub and leaf litter we spotted our second orchid, and one we would see more of out on the margins of the grassland, the Common Twayblade (*Neottia ovata*).



Common Twayblade (*Neottia ovata*)



Only half of the lip in the Common Twayblade (*N. ovata*) is visible outside the flower, the remainder is hidden inside the flower. The dark green lip oozes sugar to attract flies into the flower, where the base of the pollinia glues itself to the head of the insect.



Also growing on the margin of the grassland was Wild Privet (*Ligustrum vulgare*)



Woodland edge and chalk grassland

Growing both on the margins of the woodland and grassland, and the grassland itself was the Common Spotted orchid (*Dactylorhiza fuchsii* ssp. *fuchsii*).



Common Spotted orchid (*Dactylorhiza fuchsii* ssp. *fuchsii*)

The members of the *Dactylorhiza* genus of orchids, which in the UK comprises the Spotted and Marsh orchids, can be difficult to differentiate. One useful characteristic is that Marsh orchids have hollow stems and Spotted orchids have a solid stem. The markings on the lip and its shape are also used for identification purposes. For example, in the Common Spotted orchid (*Dactylorhiza fuchsii* ssp. *fuchsii*) the middle and lateral lobes on the lip are roughly the same size, whereas in the Heath Spotted orchid (*Dactylorhiza maculata*), the middle lobe is much smaller than the lateral lobes.



Common Spotted orchid
(*Dactylorhiza fuchsii* ssp. *fuchsii*)



Heath Spotted orchid
(*Dactylorhiza maculata*)

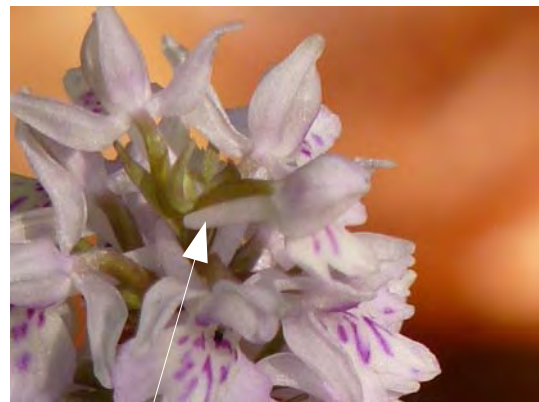
The open grassland area was also home to the Common or Chalk Fragrant orchid (*Gymnadenia conopsea*) which unlike the Common Spotted orchid does not have spotted leaves, and its leaves are also much narrower than those of the Common Spotted orchid. Its flowers lack the lip markings typical of the spotted orchids, and their spurs are much longer.



Chalk Fragrant Orchid (*Gymnadenia conopsea*)



Long spur of Chalk Fragrant Orchid
(*Gymnadenia conopsea*)



Short spur of Common Spotted orchid
(*Dactylorhiza fuchsii* ssp. *fuchsii*)

The Fragrant orchids were once thought of as three subspecies but are now considered to be three distinct species. They are differentiated between by the shape of their lips. In the Chalk Fragrant orchid the lobes are almost equal in length, and the overall shape of the lip is not distinctly angled. The Marsh Fragrant orchid (*Gymnadenia densiflora*) has a distinctly angled lip, and in the Heath Fragrant Orchid (*Gymnadenia borealis*) the lobes are not as obvious and the lip is more diamond shaped. The Chalk Fragrant orchid also has narrower sepals. Each species has a distinct scent, for example the Heath Fragrant orchid is clove scented, the Chalk Fragrant orchid reminded me of Lilac (*Syringa*).



Chalk Fragrant orchid
(*Gymnadenia conopsea*)
Lobes equal



Marsh Fragrant orchid
(*Gymnadenia densiflora*)
Angled lip



Heath Fragrant Orchid
(*Gymnadenia borealis*)
Lip diamond

The chalk grassland on Box hill is grazed by cattle which prevents certain types of plants from dominating the vegetation and therefore helps to maintain the diversity, in 1/16m² it is possible to find 25 different plant species. In the spot we looked at we found



Salad Burnet (*Sanguisorba minor ssp. minor*) – pinnate leaves with blue-green underside.



Wild Marjoram
(*Origanum vulgare*)



Rough Hawkbit (*Leontodon hispidus*) – which can be differentiated from Cat's Ear (*Hypochaeris radicata*) by the looking at the hairs. In Hawkbit they are T or Y shaped, whereas in Cat's Ear they are unbranched.



Mouse-Ear Hawkweed (*Pilosella peleteriana*) – pale yellow flowers, long hairs on the upper side of the leaf and white underside



Wood Sage
(*Teucrium chamaedrys*)



Common Bird's Foot Trefoil
(*Lotus corniculatus*)
5 leaflets which are actually 3
leaflets and 2 stipules



Common Hedge Bedstraw
(*Galium mollugo*)



Common Milkwort (*Polygala vulgaris*) – is a true colour polymorph in the plant world, there are white, pink and blue forms



Stemless/Dwarf Thistle (*Cirsium acaule*)



Wild Strawberry (*Fragaria vesca*) – can be differentiated from the Barren Strawberry (*Potentilla sterilis*) by looking at the toothed leaflets, in the common strawberry the apical tooth is as long or longer than the side teeth, whereas in the barren strawberry it is shorter.



Yellow-wort
(*Blackstonia perfoliata*)

Back along the side of the path at the edge of the woodland area, we were shown the Greater Butterfly orchid (*Platanthera chlorantha*), which differs from the Lesser Butterfly orchid (*Platanthera bifolia*) not in size, but rather a subtle difference in the arrangement of the pollinia. In the Greater Butterfly orchid, the pair of pollinia lean in towards each other, whereas in the Lesser Butterfly orchid they are parallel to each other. The Lesser Butterfly orchid is the rarer of the two and is to be found growing on more acid soils.



Location of the Greater Butterfly Orchid colony.





A clear example of the twisted ovary that results in the flower being turned upside-down.



Grassland and scrub, including numerous examples of wild roses.

Whilst walking to the next orchid site, David gave us a quick introduction into how to tell some of the native Dog Roses apart. There are three groups of the roses, the true dog roses, the sweet briars, and the hairy dog roses.



Small-flowered Sweet-briar (*Rosa micrantha*) has pale pink flowers with reflexed sepals. The crushed leaves smell of apple because the underside of the leaves are covered in glands. The stems only have prickles with broad-bases and they are hooked, there are no smaller prickles or stout bristles.



Sweet-briar (*Rosa rubiginosa*) has flowers that are usually a darker pink, and the sepals are not reflexed. It has a mixture of prickles and bristles on its stems that vary in size, and the plant itself is more upright in form. The sepals remain on the fruit whereas in *R micrantha* they fall before the fruit ripens.

Some of the other plants we came across in the scrub:



Spindle (*Euonymus europaeus*)
– The only woody shrub with green stems.



Hairy St John's Wort (*Hypericum hirsutum*)



Wild Mignonette (*Reseda lutea*)



Wild Parsnip (*Pastinaca sativa*) – the sap of this plant is a skin irritant.

We stopped for lunch next to a look-out tower/folly that had a Holm Oak (*Quercus ilex*) growing up through it's centre. It's amazing how adaptable plant are!



Whilst eating someone pointed out an interesting feature of *Cornus* leaves that can be used to identify them. The xylem vessels have spiral thickening, which allows them to be stretched in the young leaves. So if a young leaf is torn gently in half and pulled apart the xylem vessels can be seen stretching as fine threads between the two halves.



The stretchy xylem vessels of *Cornus*.



After lunch we headed back down onto an area of grassland and scrub to look for Pyramidal and Bee orchids, but first came across a couple more interesting plants. These included the Horse-shoe vetch which is well known for being the food plant of the rare Adonis Blue butterfly, although this species of butterfly isn't found on Box Hill. The vetch has flowers like those of Bird's Foot Trefoil but leaves like a vetch.



Common Bird's-foot trefoil (*Lotus corniculatus*)



Clustered Bellflower
(*Campanula glomerata*)



Vipers Bugloss (*Echium vulgare*) is the only member of the Boraginaceae family in the UK that has zygomorphic (Bilateral) flowers.

The flowers of Hawkweed (*Hieracium sp.*) and Hawkbit (*Leontodon sp.*) are very similar and difficult to tell apart, so David explained that they can be told apart by looking at their stems. Hawkweed has a leafy stem whilst Hawkbit only has a basal rosette of leaves.

After a lot of searching we finally came across single specimens of both the Pyramidal and Bee orchids. The Pyramidal orchid (*Anacamptis pyramidalis*) has two raised ridges on its lip that guide pollinating insects inside, a characteristic that is used to distinguish it from the Fragrant orchids. The flowers are tightly massed together, the inflorescence starting off a pyramidal shape, but often developing into more of a cylindrical shape as more flowers open towards the top of the spike.



A Pyramidal Orchid (*Anacamptis pyramidalis*) just beginning to open

An inflorescence in full bloom showing the 'guide-ridges'. (image taken a couple of weeks after course in South Downs)

The Bee orchid (*Ophrys apifera*) is self pollinated due to the lack of a natural pollinator in the UK. This is achieved by the caudicle of the pollinia elongating so that the pollen touches the stigma.



Bee orchid (*Ophrys apifera*)



Caudicle and pollinia elongating



Rock Rose
(*Helianthemum nummularium*)



The blue form of Common Milkwort
(*Polygala vulgaris*)

We then moved into an adjacent patch of woodland to find a colony of Bird's-nest Orchids (*Neottia nidus-avis*), which unfortunately were almost past their best. These lack chlorophyll and are saprophytic on Beech (*Fagus sylvatica*). It has a similar flower structure to the Twayblade. It gets its name because its roots form a tangled mess akin to a bird's nest, this is to increase the surface area for infection from the mycorrhizal fungus that assimilates from the beech. Being saprophytic is an adaptation to growing in the shade, it taps into the mycorrhiza of the tree, this is a separate association to that which feeds the protocorm after germination.



Bird's-nest Orchids (*Neottia nidus-avis*)

Moving on, we walked over to another patch of grassland to look for a Musk orchid (*Herminium monorchis*), or rather David looked for it as this area was also home to the Horse-shoe vetch and it was important not to disturb it too much. It was amazing that he spotted the single specimen at all as this is a very small orchid, the flower spike only reaching 10cm.



Musk orchid (*Herminium monorchis*)



On the way to find the Musk orchid we came across some fine examples of a type of gall known as Robin's Pincushions, caused by the gall wasp *Diplolepis rosae*.

Our next stop was alongside a bank of vegetation where there had been a report of a red form of the Common Spotted orchid (*Dactylorhiza fuchsii* var. *rhodochila*) that David wanted to confirm.



The red form growing adjacent to the more common colour form.



Dactylorhiza fuchsii



Dactylorhiza fuchsii var. *rhodochila*



Colouration is variable from pale to darker pink, lip with typical bold markings.



Lip very darkly pigmented with markings not clearly visible. White margin to the lip.

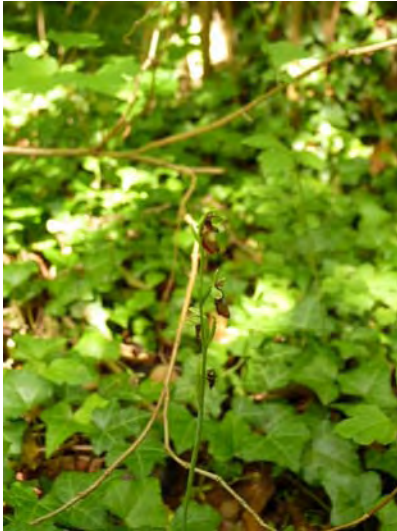
Our final stop before heading back to the field centre was a rather surprising one as David took us to an area of scrub alongside the main road. There we found a substantial colony of Man orchids (*Orchis anthropophora*) growing underneath the trees.



Norbury Park, Surrey (Wildlife Trust Reserve).

Norbury Park is a nature reserve on chalk soil with a mixture of grassland, woodland and farmland habitats.

This was a short trip at the end of the day to find the Fly orchid (*Ophrys insectifera*) in an area of woodland beside a footpath. David mentioned that the population had been declining because the area was becoming too dense and shaded, however recently a nearby area has been opened up to form a clearing in the hope that it might benefit the population. We split up to search through the woodland, and it was like searching for a needle in a haystack, but eventually someone spotted a single specimen still in flower.



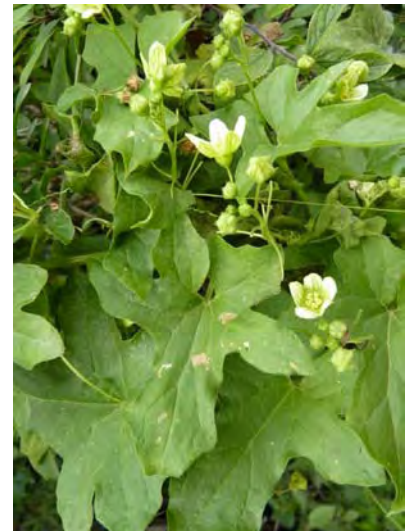
Some of the other plants we came across:



Black Horehound
(*Ballota nigra*)
typically found growing on chalk.



Black Bryony
(*Tamus communis*)
with its heart/arrow shaped leaves spotted on Box hill.



White Bryony
(*Bryonia cretica*)
with leaves similar in shape to cucumber leaves.



Broad-leaved Helleborine
(*Epipactis helleborine*)
just coming into flower.

Field excursions – Day 2

Ashdown Forest, East Sussex (Heathland and Marshland orchids)

Ashdown forest lies within the High Weald Area of Outstanding Natural Beauty, occupying the highest and most Northerly sandstone ridge in the AONB. It rises to an altitude of 732ft (223m) and is the largest area of lowland heath in the South East. The predominant soils are sands, silts and clays.

We visited two sites, the first an open heathland, and the second heathland with areas of marsh/bog.

Heathland



Dodder
(*Cuscuta epithymum*)
a parasitic plant found on
heathers, gorses and wild
thyme.



Heath Bedstraw
(*Galium saxatile*)



Lesser Heath Stitchwort
(*Stellaria graminea*)



Cross-leaved Heath
(*Erica tetralix*)

found in wetter areas and has
pale pink flowers and whorls of
4 hairy and dull leaves



Bell Heather
(*Erica cinerea*)

found in drier areas and has
darker pink flowers, and leaves
with a second smaller leaf in
the axils.



Ling
(*Calluna vulgaris*)



Tormentil
(*Potentilla erecta*)



Purple Moor-grass
(*Molinia cerulea*)

We also saw Eyebright (*Euphrasia officinalis*) which is partially parasitic on grasses (no photo).

Heath Spotted orchid (*Dactylorhiza maculata*)



Variation in the colouration of the Heath Spotted orchid (*Dactylorhiza maculata*)

Dactylorhiza maculata (top)
Dactylorhiza fuchsii (bottom)

Heath Fragrant orchid (*Gymnadenia borealis*)



There are problems in the area where the orchids are to be found in terms of encroachment from Bracken, and it's management is tricky. Bracken is often controlled by cutting twice a year, once in spring and then again in August, however this method isn't suitable where there are orchids.



Marshland



The Early Marsh Orchid (*Dactylorhiza incarnata*) has 4 subspecies and they are all characterised by having a fold down the middle of the lip, the markings being loops rather than spots, and sepals that stand up rather than down. The leaves are a yellow-green and have hooded tips. *D. incarnata* ssp *pulchella* has purple tinged bracts.



Early Marsh Orchid (*Dactylorhiza incarnata*)



The hooded tip of the leaf



Bog Asphodel
(*Narthecium ossifragum*)



Cotton Grass
(*Eriophorum* sp.)



Round-leaved Sundew (*Drosera rotundifolia*)



Bog Pimpernel
(*Anagallis tenella*)



Lousewort
(*Pedicularis sylvatica*)



Bog Pondweed
(*Potamogeton polygonifolius*)



Yellow Sedge
(*Carex viridula*)



Star sedge
(*Carex echinata*)



Dwarf Gorse (*Ulex minor*)



Gorse
(*Ulex europaeus*)



Both *Ulex* together



Petty Whin
(*Genista anglica*)
the seedpods are home to a rare weevil.

High Hurstwood, East Sussex



Our final site was an unimproved grassland wild flower meadow on neutral soil at High Hurst Wood, where we were hoping to find the Southern Marsh orchid (*Dactylorhiza praetermissa*) still in flower.

The Southern Marsh orchid (*Dactylorhiza praetermissa*) has a flatter lip than the Early Marsh orchid, and the dominant pattern is spots rather than loops. The leaves are green rather than yellow-green and not hooded at the tip.



No hooded tip



Ragged robin
(*Lychnis flos-cuculi*)



Meadow Buttercup
(*Ranunculus acris*)



Meadow Fescue
(*Festuca pratensis*)



Hairy Sedge
(*Carex hirta*)



Marsh Thistle
(*Cirsium palustre*)



Hard Rush (*Juncus inflexus*) has an interrupted pith.



Tufted Forget-me-not (*Myosotis laxa*).

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I would also like to acknowledge David Streeter for his expertise in showing us so much in two days.

Wild orchids of Scotland

A FSC course held at Kindrogan Field centre and led by Martin Robinson
19-23 June 2012



**Report by
Kate Evans**

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Note: All photographs are authors own.

Introduction

This is the second part of a report on two field courses on British wild orchids, and covers the second field course based at Kindrogan FSC centre in Scotland (attendance deferred from 2011 due to illness). This course was led by Martin Robinson and covered the orchid species found in Scotland, with the evening lectures giving details about the species, whilst the field excursions during the three days enabled us to see many of the species in their natural habitat, and observe other interesting flora and fauna.

Wild orchids of Scotland

During the evening lectures, Martin went through the different species of orchid that are to be found growing in Scotland, giving a few interesting facts about each one in turn. Some of the orchids we would see during the course, but others would already have flowered, and others would flower later. He also recommended several books covering British orchids where we would find more detailed information.

Sword-leaved Helleborine (*Cephalanthera longifolia*)

- The only white flowering helleborine to be found in Scotland
- It grows in woodland habitats but requires some sun.
- It is a species that is declining throughout its range. This is due to many woodlands not being managed and consequently they become darker and less suited to this orchid.
- The orchid is cross pollinated and studies have found that successful pollination may be linked to how sunny its growing site is, with less seed capsules being produced in darker habitats than sunnier ones.

Marsh Helleborine (*Epipactis palustris*)

- This is a very rare orchid in Scotland, only found growing in 4 locations.
- It is associated with base-rich flushes, and often to be found growing in dune slacks, grassland and meadow. It flowers in July and is cross-pollinating.

Broad-leaved Helleborine (*Epipactis helleborine*)

- This is found growing in the central belt of Scotland where it is fairly common
- It likes dappled or partial shade
- It flowers in July and is cross-pollinating

Young's Helleborine

- This was recorded as a new species in the 1980's, however the RBGE¹ have since found it to be a form of Broad-leaved Helleborine
- It is able to self-pollinate
- Found growing on slag heaps in the major industrial regions, responding to metals in the soil
- It is only found growing in small populations.

Dune Helleborine (*Epipactis dunensis*)

- There are two varieties of this orchid, the 'typical' Dune Helleborine is found growing in coastal habitats whereas the 'Tyne' Helleborine is found growing inland. They also show a difference in the lip of the flowers, with the lip curving backwards in the 'typical' variety and being straight in the 'Tyne' variety, the latter are thought to resemble *Epipactis leptochila*. The 'typical' variety also has a red base to its flower stalks whereas the 'Tyne' variety doesn't.
- At one stage the Dune Helleborine (*E. dunensis*) and the Narrow-lipped Helleborine (*Epipactis leptochila*) were thought to be one and the same because of the similar 'Tyne' Helleborine being found growing alongside the Dune Helleborine.
- It is the 'Tyne' variant that is to be found growing in Scotland, with the 'typical' variant found growing on the coast in North Wales, Merseyside, Lancashire and Cumbria, and the Narrow-lipped Helleborine to be found growing in beech woodlands in areas south of a line from Northumberland across to Mid Wales.
- The Lindisfarne Helleborine (*Epipactis sancta*) was once thought to also be a Dune Helleborine, however genetic studies have determined that they are different enough to be made a distinct species that is endemic to the island.
- *E. dunensis* is endemic to Great Britain.

¹RBGE – Royal Botanic Garden Edinburgh

Dark-red Helleborine (*Epipactis atrorubens*)

- A very distinct helleborine in terms of both colour and habitat
- It is to be found growing on limestone in North Wales, England and Scotland and on the 'Burren' in the West of Ireland.

Common Twayblade (*Neottia ovata*)

- A very common species
- Very adaptable in its growing conditions although prefers damp woodland
- It has no spur.

Lesser Twayblade (*Neottia cordata*)

- Found growing on moorland and also in pine forests
- It is probably far more numerous than is thought because its small size makes it hard to spot amongst other moorland species.
- It is pollinated by midges

Bird's Nest Orchid (*Neottia nidus-avis*)

- These appear to be very different to the other *Neottia* species, but it is the flower structure and pollination mechanism that links them. They all have hairs inside the flower that release pollen when an insect touches them.
- They typically grow in beech woods, but can also be found under other tree species which may be as a result of a previous beech wood on the site.

Creeping Lady's-tresses (*Goodyera repens*)

- Mostly a northern species in the UK, and in particular north west Scotland. There is also an anomaly population in East Anglia.
- To be found growing in pine plantations

Irish Lady's-tresses (*Spiranthes romanzoffiana*)

- Found growing on the West coast of Scotland
- It is a North American species which is also found in Ireland and Scotland.
- It grows in close cropped grazed pasture
- It doesn't set seed well, but occasionally seedlings appear on new sites.

Bog Orchid (*Hammarbya paludosa*)

- Most orchid flowers are resupinate, that is they appear upside down because the flower stalk or ovary has rotated 180°, however in the Bog Orchid it twists 360° and therefore the flowers appear the right way up.
- It is pollinated by tiny flies and midges
- Likes very wet conditions, sphagnum moss and bogs
- It is cross-pollinating, but also reproduces vegetatively by producing tiny bulbils around the edge of its leaves that drop off, but need to be infected by the correct fungi to develop further.
- They flower between July and August.

Coralroot Orchid (*Corallorhiza trifida*)

- Has a northern distribution in the UK
- Like the Bird's-nest orchid, it has no chlorophyll
- It is totally dependent on its fungal association for its entire life
- It is found growing in wet woodlands and dune slacks, the populations in the latter tend to be more compact and with a more red colouration

Frog Orchid (*Dactylorhiza viridis*)

- A widespread species
- Originally placed in the genus *Coeloglossum*, but recently moved to *Dactylorhiza*

- Unlike most other *Dactylorhiza* species, it does produce nectar and therefore doesn't 'cheat' visiting pollinating insects
- Will hybridize with other *Dactylorhiza* species.

Fragrant Orchid (*Gymnadenia* sp.)

- Originally thought to be a single species with three subspecies, but has now been split into three distinct species – Common or Chalk Fragrant Orchid (*G. conopsea*), Heath Fragrant Orchid (*G. borealis*), and Marsh Fragrant Orchid (*G. densiflora*)
- Widespread throughout the UK, although it is mostly the Heath Fragrant Orchid that is found in Scotland.
- *G. borealis* is said to have a scent resembling that of carnations, and *G. densiflora* has a scent resembling cloves.
 - Heath Fragrant Orchid
 - The identifying features of the Heath Fragrant Orchid are that its labellum is longer than it is wide, and it is also not particularly lobed.
 - Has a very long fine spur that does contain nectar
 - Found growing in dry open grassland.
 - Chalk Fragrant Orchid
 - More of a southern UK species.
 - Marsh Fragrant Orchid
 - grows in wet flushes
 - flowering between July and August

Small White Orchid (*Pseudorchis albida*)

- This has a fairly Northern range in the UK.
- It has no spur, and the labellum is divided into three deep lobes.

Greater Butterfly Orchid (*Platanthera chlorantha*)

- This species is genetically very similar to the Lesser Butterfly Orchid (*P. bifolia*) but they differ in their morphology.
- Both species are moth pollinated, grow in half-light, and have white flowers with a long spur full of nectar.
- Both species are rare in Perthshire
- It is more of a calcicole than some other orchids and is to be found growing in lime-rich soils and base-rich flushes, and also in woodlands.

Lesser Butterfly Orchid (*Platanthera bifolia*)

- This species has now disappeared from large parts of England.
- It is more acid tolerant than *P. chlorantha*
- There is a peloric form which has three petals and virtually no sepals.

Early Purple Orchid (*Orchis mascula*)

- This is a very widespread species in the UK
- The leaves occur only at the base, with a clear stem.

Common Spotted Orchid (*Dactylorhiza fuchsii*)

- Most orchids (and plants) in the past were classified in terms of their morphology, however since the development of DNA analysis, many have been reclassified, and this is particularly the case with the genus *Dactylorhiza*. Many of the orchids now grouped within this genus had previously been classified within different genera.
- *D. fuchsii* can be differentiated from the similar Heath Spotted Orchid (*D. maculata*) by the following features
 - a longer middle lobe on its labellum.
 - generally has loop markings rather than spots on its labellum
 - usually taller

- flowers later
- it has more pronounced spots on its leaves which often look more like bars.
- found growing in grassland rather than the heathland favoured by the Heath Spotted.
- There are two diploid species within the *Dactylorhiza* genus, Common Spotted Orchid (*D. fuchsii*) and the Early Marsh Orchid (*D. incarnata*) and hybridisation between these two species in the past has led to the development of all the other species within the genus.
- *D. fuchsii* has several subspecies and varieties
 - ssp. *hebridensis* which grows in the Machair and has larger flowers. There aren't many examples of the straight species growing in these areas.
 - var. *alpina* has a deeper flower colour and is shorter in stature
 - var. *okellyi* is very pale in colour and is the variety found growing in Ireland.

Heath Spotted Orchid (*Dactylorhiza maculata*)

- Has a wide frilly labellum covered in dots
- It is an upland species in the UK
- It has narrower leaves than the Common Spotted Orchid and smaller spots on the leaves.
- Both the Common and Heath Spotted orchid can be differentiated from the Marsh orchids by having a solid stem rather than the hollow stem of the latter.
- Variation in colour and spotting occur
 - labellum markings can be more loopy than dotty which can indicate the presence of some Common Spotted genes
 - the leaves can also be without spots
- Often found growing in large colonies

Heath Spotted and Common Spotted Orchids frequently cross pollinate giving rise to a variety of hybrids that frequently have the wider leaves of the Common Spotted and the labellum markings of the Heath Spotted. The term 'Hybrid Swarm' is given to a population of mixed hybrids.

Dactylorhiza x transiens is a recognised hybrid between the two species.

Early Marsh Orchid (*Dactylorhiza incarnata*)

- there are five subspecies which vary in colour and habitat but all have certain characteristics in common
 - the labellum is compressed, long and narrow
 - the flowers are small
 - the sepals look like rabbit ears
 - there is a double loop of markings on the labellum and spots within the loops. If there are any spots outside of the loops then it is likely to be a hybrid.
- The subspecies are
 - *D. i. ssp. incarnata* which is generally found growing in base-rich flushes.
 - The typical flower colour is a fleshy pink, but there is variation as was demonstrated at the Little Ballo site we visited, where the flower colour has changed over time.
 - *D. i. ssp. coccinea* tends to be found growing on coastal sand dunes and machair.
 - Its flowers are a reddish colour, similar to the straight species we saw growing at Little Ballo.
 - It has broader leaves which are not as erect
 - there is also dark pigmentation on the stem.
 - *D. i. ssp. pulchella*
 - grows in more acidic conditions
 - the flower colour is more purple pink than flesh pink
 - *D. i. ssp. cruenta* found growing mainly in Ireland, but with a few populations in Scotland
 - the leaves are spotty on the upper and under side
 - the bracts are also spotty.
 - *D. i. ssp. ochroleuca* has unmarked creamy flowers but is very rare and only found growing in alkaline fens in East Anglia.

- Differences in soil chemistry may be the reason why different populations vary in colour.

Hebridean Marsh Orchid (*Dactylorhiza ebudensis*)

- it is touted as an endemic species only found growing on North Uist, as a result of DNA analysis from a single plant.
- It's leaves are very heavily spotted/marked with splotches, some leaves almost completely covered.

Northern Marsh Orchid (*Dactylorhiza purpurella*)

- has broad leaves
- is a tetraploid
- *D. purpurella* var. *cambreensis* has bold spots on the tops of its leaves.
- The Northern Marsh Orchid frequently hybridises with the Heath Spotted Orchid giving rise to the hybrid *Dactylorhiza x formosa*
- They also hybridise with the Common Spotted Orchid giving rise to the hybrid *Dactylorhiza x venusta* which has leaves that almost appear striped, another common hybrid.

Pugsley's Marsh Orchid (*Dactylorhiza traunsteinerioides*)

- to be found growing in very base-rich flushes where the Black Bog-rush (*Schoenus nigricans*) is found.
- It tends to have a one-sided inflorescence
- the stem is deeply coloured
- the labellum has a pronounced middle lobe
- there are isolated populations around the UK
- Lapland Marsh Orchid (*D. t. lapponica*)
 - found in North West Scotland
 - more deeply marked

Pyramidal Orchid (*Anacamptis pyramidalis*)

- a pioneer species
- found mainly on chalk and limestone but is also found growing in the mackair (a shell limestone)

Green-winged Orchid (*Anacamptis morio*)

- Only small populations in Ayrshire
- quite a variable species

Bee Orchid (*Ophrys apifera*)

- In the UK it is more of a southern species although there are now some populations in Scotland, likely to be a result of climate change.

Cultivation of orchids in the garden

These are just a few things I picked up relating to growing orchids in a garden setting, mostly gained from speaking to Celia Wright (Chairperson of the Hardy Orchid Society) who happened to be attending the course.

- Determine what soil/moisture/drainage conditions you have in the garden, and also how much sun/shade each area receives.
- Find out what species of orchids grow locally, this will help indicate the types which might be easier to establish.
- One way of growing them is to actually grow them in terracotta pots, which are kept in a plunge bed except for when they are coming into flower. When flowering is approaching the pots can be planted out in the garden. After flowering they can be brought back to the plunge bed where it is easier to manage the growing conditions.
- Hybrids tend to be easier to establish and have more vigour, they are also generally cheaper to purchase.
- If they are to be established in the ground, prepare the area first, a nutrient poor soil is best.
- If growing in a meadow *in situ*, don't cut the grass until the orchids have set seed to ensure dispersal.

Field Excursions

Contrary to the season being earlier than usual for the course at Jupiter Hall last year, this year the season was slightly later, and therefore Martin warned us that there were a couple of the species that may not quite be out in flower yet, although they would likely be in leaf at least.

Over the three days we visited a variety of sites ranging from wet marsh and lakes through heath and grassland, to broadleaved woodland. Each site providing examples of the flora typically found growing under the different environmental conditions.

Day 1

The Cairnwell, Glenshee

This site was situated on the slopes near the Glenshee ski site, with a mix of wet grassland and drier heather moor (Fig 1). The vegetation grows on base rich soil, of which some of the species we would come across are indicators of. We were hoping to see the Frog Orchid (*Dactylorhiza viridis*) and Lesser Twayblade Orchid (*Neottia cordata*) at this site, both species I was particularly interested in seeing, especially the latter as it is so hard to spot due to its small size.

Our first couple of plants were not orchids but carnivorous plants, Common Butterwort (*Pinguicula vulgaris*) (Fig 2) and Round-leaved Sundew (*Drosera rotundifolia*). Both have sticky leaves with which to catch insects. Continuing up and along the slope we came across several other interesting plants, namely Alpine Saw-wort (*Saussurea alpina*), Alpine Meadow Rue (*Thalictrum alpinum*) (Fig 3), Alpine Lady's-mantle (*Alchemilla alpina*) (Fig 4), Common Cowberry (*Vaccinium vitis-idaea*) (Fig 5), Common Cow-wheat (*Melampyrum pratense*) (Fig 6), Scottish Asphodel (*Tofieldia pusilla*) (Fig 7) and Alpine Bistort (*Persicaria vivipara*).

It wasn't long however before someone spotted the first Frog Orchid (*D. viridis*) (Figs 8, 9 & 10), and once we knew what we were looking for and had got our eye in, more and more were spotted. They varied somewhat in colouration from green to green tinged with red/pink (Fig 8). Many were only just opening so we were probably a few days early to get the full effect, but enough open flowers were found to give a feel for what they looked like (Fig 10). The common name is said to come from the fact that the flowers are thought to resemble a frog when seen from the side, although it was quite difficult to see the resemblance. The examples we found were shorter in stature than I had expected, but I was told by another member of the group (Celia Wright HOS Chairperson) that they can vary in size depending on the location.

Once we had all had a good look at the Frog Orchids (*D. viridis*), Martin then took us to an area of heather (Fig 11) where he knew the Lesser Twayblade (*N. cordata*) could be found, although he wasn't sure whether it would be in flower. And it was a flowerless pair of leaves that was spotted first amongst the heather and moss (Fig 12), and it took some spotting as the Lesser Twayblade is a tiny orchid only reaching a few inches in height when in flower. The leaves immediately reminded me of its relative the Common Twayblade (*Neottia ovata*) (seen on last years course), a pair situated at the base. It took a little while longer for someone to find an example in flower (Figs 13 & 14), but it was well worth the effort of peering between the heather as it is such a delicate and beautiful flower. A perfect miniature of the Common Twayblade flower, although primarily red in colour rather than green (Fig 15).

Just as we arrived back at the minibus, Martin spotted a Three Flowered Rush (*Juncus triglumis*) (Fig 16) growing at the edge of the gravel carpark, an unusual spot to find it as it is normally to be found growing in wet areas, it is however one of the plants that is associated with base-rich flushes.

The Cairnwell, Glenshee



Fig 1: The site was situated on the slopes behind the buildings in the foreground, a mix of grazed grass and heather.



Fig 2: Common Butterwort
(*Pinguicula vulgaris*)



Fig 3: Alpine Meadow-rue
(*Thalictrum alpinum*)



Fig 4: Alpine Lady's-mantle
(*Alchemilla alpina*)



Fig 5: Cowberry
(*Vaccinium vitis-idaea*)



Fig 6: Common Cow-wheat
(*Melampyrum pratense*)



Fig 7: Scottish Asphodel
(*Tofieldia pusilla*)



Fig 8: The Frog Orchid (*Dactylorhiza viridis*) demonstrating the variation in colouration.



Fig 9: Stem and leaves of *D.viridis*



Fig 10: Flower detail of *D.viridis*



Fig 11: Habitat of the Lesser Twayblade (*Neottia cordata*)



Fig 12: Leaf pair of *N. cordata*.



Fig 13: A couple of examples of *N. cordata*.



Fig 14: Detail of hairs on stem of *N. cordata*.



Fig 15: Detail of the inflorescence and flowers of *N. cordata*.



Fig 16: Three Flowered Rush (*Juncus triglumis*)

Spittal of Glenshee mire

Moving on to a site just down the road from the Cairnwell, the mire at Spittal of Glenshee is a wet grassland habitat (Fig 17) where we hoped to see the Northern Marsh Orchid (*Dactylorhiza purpurella*), Early Marsh Orchid (*Dactylorhiza incarnata*) and Heath Spotted Orchid (*Dactylorhiza maculata*). To get to the mire we first had to walk up a fairly steep track, alongside which we found a population of Northern Marsh Orchid (*D. purpurella*) (Fig 18) growing under some trees. Last year we saw the Southern Marsh Orchid (*Dactylorhiza praetermissa*), so it was nice to see its Northern counterpart. The Northern Marsh Orchid (*D. purpurella*) is generally a darker, redder purple than the Southern with a smaller lip that is distinctly diamond shaped and has darker markings (Fig 19). The leaves are also generally a darker green and broader.

Carrying on up the track we passed some Heath Speedwell (*Veronica officinalis*) (Fig 20), and numerous examples of Mountain pansies (*Viola lutea*) (Fig 21) showing their variation in colouration. On reaching the mire itself we started to come across species associated with damper growing conditions including Alpine Bistort (*Persicaria vivipara*) (Fig 22), Water Avens (*Geum rivale*) (Fig 23) and Marsh-marigold (*Caltha palustris*) (Fig 32).

Our second orchid on this site was the Early Marsh Orchid (*Dactylorhiza incarnata* subsp. *incarnata*) (Fig 24), which can be distinguished from the Northern Marsh Orchid (*D. purpurella*) by its upright grass green leaves (Fig 25) and its 'bag' shaped spur (Fig 27). The markings on its labellum should all fall within the loop (Fig 26), Martin said that if any are outside the loop it is an indication that the orchid is in fact a hybrid between an Early Marsh and another *Dactylorhiza* species found growing at the same location, in this case either the Northern Marsh (*D. purpurella*) or Heath Spotted (*D. maculata*).

Other plants of interest were two species of Horsetail, Wood Horsetail (*Equisetum sylvaticum*) (Fig 28) and Marsh Horsetail (*Equisetum palustre*) (Fig 29), the former is the only member of the genus to have secondary branching. Chickweed Wintergreen (*Trientalis europaea*) (Fig 30) was another nice plant to come across, as was Lousewort (*Pedicularis sylvatica*) (Fig 31), a plant I'd seen for the first time on last year's course. Creeping willow (*Salix repens*) (Fig 33) was another good find together with the Lady-fern (*Athyrium filix-femina*) (Fig 35) with its red stems and Broad Buckler fern (*Dryopteris dilatata*) (Fig 34).

The third orchid on our list for the site, Heath Spotted Orchid (*D. maculata*), was finally spotted in flower (Figs 36, 37, 38 & 39). This species is more tolerant of acidic conditions than the Common Spotted Orchid (*D. fuchsii*). We then came across a likely hybrid between Heath Spotted (*D. maculata*) and Early Marsh Orchid (*D. incarnata*), suggested by it having leaves akin to an Early Marsh but having flowers more akin to the Heath Spotted (Fig 40). Nearby I spotted another orchid being pollinated by a fly (Fig 41). Another possible hybrid between a Northern Marsh (*D. purpurella*) and Heath Spotted (*D. maculata*) was then found, this time the leaves had spots as in the Heath Spotted, however the spur was bag-shaped and blunt like in the Northern Marsh rather than narrow and tapered in the Heath Spotted (Fig 42). Yet another hybrid was found, again between the Northern Marsh (*D. purpurella*) and Heath Spotted (*D. maculata*), this time the tell tale features were: Broad leaves (NM); spotting on the leaves (HS); Pale flower colour (HS); Narrow tapered spur (HS); Shape of labellum (NM) but with the frilly edge of the Heath Spotted but without its clear lobes (Fig 43). Martin commented that this is a common hybrid where both species are to be found growing and I expect there were many more examples on the site we didn't see.

Finally Martin pointed out a textbook example of a Northern Marsh Orchid (*D. purpurella*) (Fig 44), a very useful thing to see and keep in mind when there are so many hybrids around. I found it became confusing trying to remember the different characteristics of the three pure species on this site, it is something I will definitely have to spend more time working on. Leaving the site I spotted some dainty Heath Bedstraw (*Galium saxatile*) (Fig 45) and Eyebright (*Euphrasia* sp.) (Fig 46). After a quick lunch stop we all piled back into the minibus and headed to our next destination, however we had only got to the end of the road when someone shouted 'Orchids on the verge', so of course we had to stop and take a closer look (Fig 47). It was well worth the stop as there were numerous hybrids between the Northern Marsh (*D. purpurella*) and Heath Spotted (*D. maculata*)

orchids, some of which were likely to be F₁ hybrids due to the vigour of the plants (Fig 48). Interestingly, Martin informed us that the Heath Spotted Orchid (*D. maculata*) is itself the result of hybridization between the Early Marsh (*D. incarnata*) and Common Spotted Orchid (*D. fuchsii*). He reminded us to always look for the common features shared with the two parents when looking at hybrids (Fig 49). Along with the display of orchids there was more Water Avens (*Geum rivale*) (Fig 51), Red Clover (*Trifolium pratense*) (Fig 50), and some good examples of the Melancholy Thistle (*Cirsium heterophyllum*) (Fig 52), another new plant for me.

Spittal of Glenshee Mire



Fig 17: The mire



Fig 18: The Northern Marsh Orchid (*Dactylorhiza purpurella*)

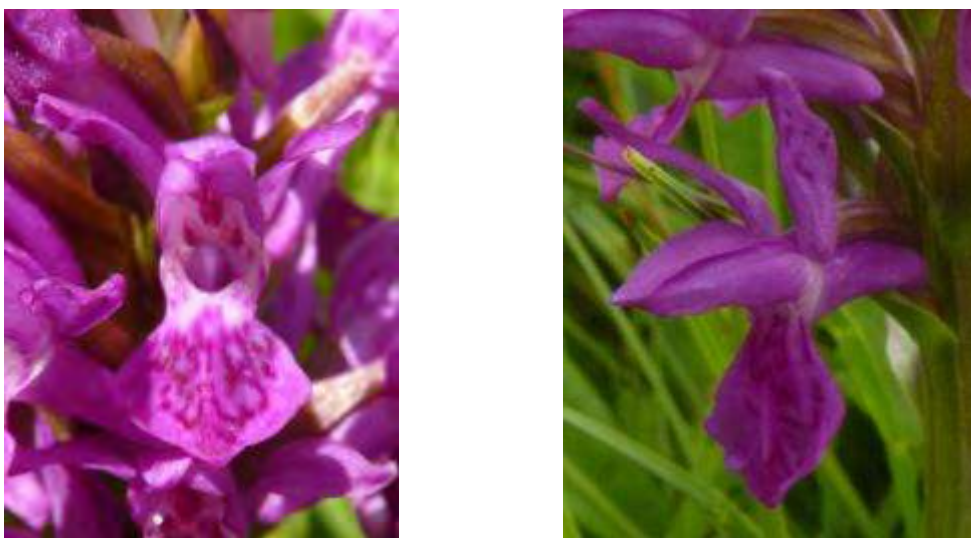


Fig 19: Flower detail of *D. purpurella* showing labellum shape and markings, and the 'bag' shaped spur.



Fig 20: Heath Speedwell (*Veronica officinalis*)



Fig 21: Mountain Pansy (*Viola lutea*) showing some of the colour variations.



Fig 22: Alpine Bistort (*Persicaria vivipara*)



Fig 23: Water Avens (*Geum rivale*)



Fig 24: Early Marsh Orchid (*Dactylorhiza incarnata subsp. incarnata*)



Fig 25: Leaves of *D.i. subsp incarnata*



Fig 26: Flower detail of *D.i. subsp incarnata* showing labellum markings within loops



Fig 27: Flower detail of *D.i. subsp incarnata* showing bag shaped spur.



Fig 28: Wood Horsetail (*Equisetum sylvaticum*) showing secondary branching



Fig 29: Marsh Horsetail (*Equisetum palustre*)



Fig 30: Chickweed-wintergreen (*Trientalis europaea*)



Fig 31: Lousewort (*Pedicularis sylvatica*)



Fig 32: Marsh-marigold (*Caltha palustris*)



Fig 33: Creeping Willow
(*Salix repens*)



Fig 34: Broad Buckler-fern
(*Dryopteris dilatata*)



Fig 35: Lady-fern
(*Athyrium filix-femina*)



Fig 36: Heath Spotted Orchid
(*Dactylorhiza maculata*)



Fig 37: Flower detail of *D. maculata* showing labellum and spur.



Fig 38: More typical labellum
markings of *D. maculata*



Fig 39: Leaf of *D. maculata*



Fig 40: Possible hybrid between Early Marsh Orchid (*D. incarnata*) and Heath Spotted Orchid (*D. maculata*). Leaves akin to Early Marsh and Flowers to Heath Spotted.



Fig 41: Orchid being pollinated by a fly.



Fig 42: Possible hybrid between Heath Spotted Orchid and Northern Marsh Orchid. Leaves akin to Heath Spotted and flower spur to Northern Marsh.



Fig 43: Possible hybrid between Heath Spotted (*D. maculata*) and Northern Marsh orchid (*D. purpurella*). Broad leaves and flower shape as in Northern Marsh; Leaf spotting, labellum frilly edge, flower colour and narrow spur as in Heath Spotted

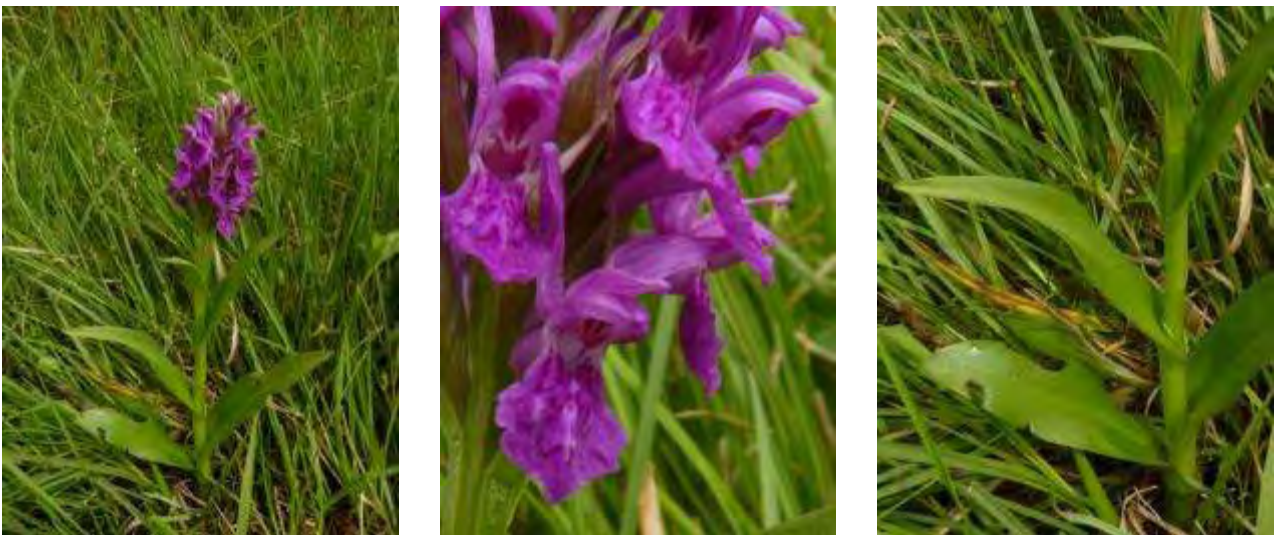


Fig 44: A 'textbook' example of a Northern Marsh Orchid



Fig 45: Heath Bedstraw
(*Galium saxatile*)



Fig 46: Eyebright sp.
(*Euphrasia* sp.)



Fig 47: Our impromptu roadside stop



Fig 48: A few examples of the likely hybrids between Northern Marsh (*D. purplella*) and Heath Spotted Orchids (*D. maculata*). For example the middle specimen has the broad leaves and flower colour of the Northern Marsh; but, the leaf spotting and flower shape of the Heath Spotted.



Fig 49: Martin pointing out some features on a hybrid suggesting what the parentage is.



Fig 50: Red Clover
(*Trifolium pratense*)



Fig 51: Water Avens
(*Geum rivale*)



Fig 52: Melancholy Thistle
(*Cirsium heterophyllum*)

Black Loch, Blairgowrie

Our next site was situated on a golf course, alongside the edge of a lake. The habitat was damp, and Martin informed us that the water levels of the lake and groundwater fluctuated and this he thought affected our next specimen, the Coralroot Orchid (*Corallorhiza trifida*). Unfortunately for us, we couldn't find any examples of the orchid, which typically prefers to grow just at the waters edge. Martin suggested that as coral root grows in habitat where the water-table is at or near the surface, as the water-table levels fluctuate, the water levels may not have been favourable at the time of flower initiation, hence no flowers, although it could also be that we were too early/late. It was a disappointment not to see as it is an orchid I have yet to see, however it wasn't a wasted stop as I did spot some Common Wintergreen (*Pyrola minor*) (Fig 53) and Marsh Pennywort (*Hydrocotyle vulgaris*) (Fig 54), both new to me.

Black Loch, Blairgowrie



Fig 53: Common Wintergreen
(*Pyrola minor*)



Fig 54: Marsh Pennywort
(*Hydrocotyle vulgaris*)

Stormont Loch, Blairgowrie

Our final site of the day was a woodland alongside another lake (Fig 55), and this time we were hoping to find Creeping Lady's-tresses (*Goodyera repens*) in flower. This was one of the orchids Martin had warned us might not quite be in flower, although we should see the leaves at least. It wasn't long before the first plants were found, and as suspected, although some had flower spikes, the flowers themselves were not open yet (Figs 56, 57, 58 & 59). We could however clearly see why they are called Creeping Lady's Tresses, as the plants were growing in lines, and they were growing wherever we looked, so it must be quite a show when the flowers are open.

To make up for this disappointment, Martin offered to take us a little further on to a spot where he knew the rare Twinflower (*Linnaea borealis*) could be found growing. The exact spot took some finding as a lot of the woodland looked the same, and spotting the Twin Flower was just as tricky as the flower are small. We first found an example of the leaves and stem, which helped as we then all knew what to look for. Eventually someone spotted a flower albeit with only a single flower rather than the normal two, but it was worth searching for, although I don't think we would have found it without 15 pairs of eyes searching! (Fig 60).

Stormont Loch, Blairgowrie



Fig 55: Typical Pine forest habitat of Creeping Lady's-tresses orchid (*Goodyera repens*)



Fig 56: Rosettes of Creeping Lady's-tresses orchid (*G. repens*)



Fig 57: Flower spikes just emerging



Fig 58: Detail of hairs on flower stem



Fig 59: Details of veins forming a net over leaf surface in contrast to the parallel veins of most British orchids.



Fig 60: The foliage and flower of the rare Twinflower (*Linnaea borealis*)

Day 2

Forestmuir, Forfar

Our first site for the second day was an area of damp grassland with a few marshy areas (Fig 61), which is managed through grazing a few Highland Cattle on the site (Fig 62). Here we were hoping to find Lesser Butterfly orchids (*Platanthera bifolia*) and Heath Fragrant orchids (*Gymnadenia borealis*), together with more examples of Northern Marsh Orchid (*Dactylorhiza purpurella*) and Heath Spotted Orchids (*Dactylorhiza maculata*). And it was indeed the latter two that we came across first walking through the site (Figs 63 & 64), together with a possible hybrid between Heath Spotted (*D. maculata*) and Common Spotted Orchid (*D. fuchsii*) (Leaf spotting of CS, Flower colour of HS, Labellum pattern of CS) (Fig 65). At every site where we have found Northern Marsh orchids (*D. purpurella*) growing there has been variability in the specimens, which Martin commented may be down to the Early Marsh orchid (*Dactylorhiza incarnata*) being one of its parents. The pure Northern Marsh orchids (*D. purpurella*) tend to be purple in colour and look slightly 'dumpy' in stature, whereas hybrids tend to look taller and narrower and vary in colour. It wasn't long however before someone spotted the first Lesser Butterfly orchid (*P. bifolia*) just coming into flower (Fig 66). Having seen the Greater Butterfly Orchid (*Platanthera chlorantha*) on last year's course it was great to see its close relative, and a reminder of how beautiful the flowers are of this particular genus. As was mentioned on the course last year, the main difference between the Lesser and Greater Butterfly orchid is not necessarily in size, but rather in the orientation of the pollinia, so an eye lens was a must for this orchid in particular. In the Lesser Butterfly the pollinia are held parallel to each (Fig 67 & Fig 134) other whereas in the Greater Butterfly (Fig 133) they are slanted and held further apart. The Lesser butterfly is generally daintier than the Greater Butterfly, however there is variability in both species and thus this is not a definitive way of differentiating between the two.

Soon after an example of a Heath Fragrant orchid (*G. borealis*) was found (Fig 68), a species we also saw last year so it was nice to have a re-cap of its features, and to take in its scent which to me was reminiscent of cloves or carnations. In addition to having a strong scent, the fragrant orchids also have a much longer spur than the *Dactylorhiza* species we had mostly been finding, and there are no markings on the flower, it is simply pink in colour.

After looking at some more advanced examples of the Lesser butterfly orchid (*P. bifolia*), giving us an opportunity to fully appreciate the open flowers, we came across another possible hybrid between Heath Spotted Orchid (*D. maculata*) and Common Spotted Orchid (*D. fuchsii*) (Fig 69). The distinguishing features were the broad leaves and bar like spotting of the Common Spotted and the labellum shape and markings of the Heath Spotted. A couple of other plants of interest on the site were Common Milkwort (*Polygala vulgaris*) (Fig 70) and Cross-leaved Heath (*Erica tetralix*) (Fig 71).

Forestmuir, Forfar



Fig 61:



Fig 62: The Highland Cattle that graze the site as part of it's management.



Fig 63: Heath Spotted Orchid (*Dactylorhiza maculata*) showing detail of the flower and leaf



Fig 64: Northern Marsh orchid showing detail of the flower.



Fig 65: Possible hybrid between Common Spotted orchid (*D. fuchsii*) and Heath Spotted (*D. maculata*). (Leaf spotting of CS, Flower colour of HS, Labellum pattern of CS)



Fig 66: Lesser Butterfly Orchid (*Platanthera bifolia*) showing flower detail including the long tapering spur



Fig 67: Close-up of the flower of Lesser Butterfly Orchid (*P. bifolia*) showing parallel alignment of the pollinia



Fig 68: Heath Fragrant Orchid



Fig 69: Possible hybrid between Common Spotted (*D. fuchsii*) and Heath Spotted orchid (*D. maculata*). (Broad leaves and bar like spotting CS, labellum shape and markings HS)



Fig 70: Common Milkwort
(*Polygala vulgaris*)



Fig 71: Cross-leaved Heath
(*Erica tetralix*)

Loch of Kinnordy

This was our lunch stop as it provided some shelter in the form of bird hides should it decide to rain, it is an RSPB nature reserve site and an SSSI. It is a shallow loch with a diverse range of habitats surrounding it including the loch itself, mire, fen and willow/alder scrub, and it was the latter that we were particularly interested in. Alongside the boardwalk to the first hide were numerous clumps of Common Twayblade Orchids (*Neottia ovata*) growing in amongst the bramble and scrub (Fig 72). Having seen examples of the Common Twayblade both on last years course and elsewhere it was quickly apparent that these plants were much more robust than any I had previously seen. Martin explained that this was probably because the soils around the lake were very rich.

Whilst eating our lunch in the hide we were fortunate enough to watch a female Marsh (Circus *aeruginosus*) hunting over the reed beds, an added bonus, although no Osprey fishing as we had hoped to see. However en route to our next destination, Martin stopped the minibus and pointed out an Osprey (*Pandion haliaetus*) nest on top of a pylon in the distance, apparently there are a few such nests in Scotland.

Loch of Kinnordy



Fig 72: Common Twayblade orchid (*Neottia ovata*)

Kettins

Our next site was a Beech wood, which typically had fairly sparse groundcover (Fig 73). Here amongst the trees we found numerous groups of Bird's-nest Orchids (*Neottia nidus-avis*) growing and in full flower, a nice contrast to the ones seen last year that were just going over (Figs 74 & 75). The population at this site we were told grow taller than normal for the species. There were also some examples of the seed pods left over from the previous year (Fig 76). Other species of interest at the site were Pignut (*Conopodium majus*) (Fig 79) , Pink Purslane (*Claytonia sibirica*) (Fig 78) and Three-nerved Sandwort (*Moehringia trinervia*) (Fig 77). Growing on a dead Elm tree we also found a bracket fungus growing, which I think was Dryad's Saddle (*Polyporus squamosus*) (Fig 80).

Kettins



Fig 73: Beech wood



Fig 74: Bird's-nest orchid (*Neottia nidus-avis*) showing detail of flowers.



Fig 75: Flower detail



Fig 76: Last years seed capsules



Fig 77: Three-nerved Sandwort
(*Moehringia trinervia*)



Fig 78: Pink Purslane
(*Claytonia sibirica*)



Fig 79: Pignut
(*Conopodium majus*)



Fig 80: Dryads Saddle (*Polyporus squamosus*).

Little Ballo, Sidlaw Hills

This was a very wet grassland site which is managed through cattle grazing as with Forestmuir (Fig 81). Straight away we could see a great diversity of plants growing on the site, but we were in particular looking for an unusual red form of the Early Marsh Orchid (*Dactylorhiza incarnata* ssp *incarnata*), which has been observed over the years changing from the more usual pale pink colouration of the *incarnata* subspecies of Early Marsh Orchid, to a much redder colour. There is a red flowered subspecies (*D. i. Coccinea*), however it is typically found growing in coastal dune slacks, and it is thought that the specimens found growing at Little Ballow are not subspecies *coccinea*, but rather that changes in the soil chemistry have resulted in the gradual change in colouration of the population on the site.

There were in fact two different subspecies of the Early Marsh Orchid growing in the area, *D. incarnata* subsp. *incarnata* and *D. incarnata* subsp. *pulchella*. Whilst trying to find the former amongst the long grass I spotted several other plants of interest including Yellow-rattle (*Rhinanthus minor*) (Fig 82), Eyebright sp. (*Euphrasia* sp.) (Fig 83), Changing Forget-me-not (*Myosotis discolor*) (Fig 84), Lesser Stitchwort (*Stellaria graminea*) (Fig 85), Quacking Grass (*Briza media*) (Fig 86) and Lady's-smock (*Cardamine pratensis*) (Fig 87). Then we spotted some good examples of the red form of *D.i.* subsp. *incarnata* (Fig 88) together with some Heath Spotted Orchids.

On continuing to look for plants of interest I spotted several others, all of which were new to me, Bristle Club-rush (*Isolepis setacea*) (Fig 89), Marsh Arrowgrass (*Triglochin palustre*) (Fig 90), Marsh Lousewort (*Pedicularis palustris*) (Fig 91) (I think, rather than straight Lousewort because the calyx were hairy), Lesser Spearwort (*Ranunculus flammula*) (Fig 92), Marsh Cinquefoil (*Potentilla palustris*) (Fig 93), and it was also great to see Bogbean (*Menyanthes trifoliata*) (Fig 94) growing and in flower having only seen it in cultivation previously.

A little further down the lane we stopped to look quickly at another site where the other subspecies of Early Marsh Orchid (*D. incarnata* subsp *pulchella*) was growing. It is recognised by it's light green upright leaves, purple flower colour, and having a labellum that looks compressed compared to other Early Marsh Orchids with all markings on the lip within the loops (Fig 95).

Little Ballo, Sidlaw Hills



Fig 81: Wet grassland... in more ways than one!



Fig 82: Yellow-rattle
(*Rhinanthus minor*)



Fig 83: Eyebright sp.
(*Euphrasia* sp.)



Fig 84: Changing Forget-me-not
(*Myosotis discolor*)



Fig 85: Lesser Stitchwort
(*Stellaria graminea*)



Fig 86: Quaking Grass
(*Briza media*)



Fig 87: Lady's-smock
(*Cardamine pratensis*)



Fig 88: Early Marsh Orchid (*Dactylorhiza incarnata* ssp *incarnata*) in it's Red form



Fig 89: Bristle Club-rush (*Isolepis setacea*)



Fig 90: Marsh Arrowgrass (*Triglochin palustre*)



Fig 91: Marsh Lousewort (*Pedicularis palustris*)



Fig 92: Lesser Spearwort (*Ranunculus flammula*)



Fig 93: Marsh Cinquefoil (*Potentilla palustris*)



Fig 94: Bogbean (*Menyanthes trifoliata*)



Fig 95: Early Marsh Orchid subspecies *Pulchella* showing it's light green leaves

Day 3

Straloch moraines

The first site to day was a SSSI which is managed through grazing outside of the flowering season (Fig 96). Here we were looking for Small White Orchids (*Pseudorchis albida*) primarily, and possibly carrying out a count, something Martin does each year on the course.

Our first find was Common Rock-rose (*Helianthemum nummularium*) (Fig 97), a plant I more often see growing in cultivation in it's many cultivars so it was nice to see it growing in it's natural habitat. It wasn't long however before we started to spot the Small White Orchids (*P. albida*) we had come to see (Fig 99).

There were more Creeping Willow (*Salix repens*) (Fig 98) specimens growing on this site with amazing bright orange catkins. Martin also pointed out Intermediate Wintergreen (*Pyrola media*) (Fig 100), which can be differentiated from the other white flowered *Pyrola* species by counting the number of teeth along the leaf margins. Intermediate Wintergreen (*P. media*) has the fewest number of teeth, up to 12, whereas Common Wintergreen (*Pyrola minor*) has the most, between 14 and 22. Round leaved Wintergreen (*Pyrola rotundifolia*) overlaps the other two species.

The Heath Fragrant Orchid (*Gymnadenia borealis*) was another orchid we found in flower on the site (Fig 101), another chance to take in it's wonderful scent. Also found growing was Slender St John's-wort (*Hypericum pulchrum*) (Fig 102) and Devil's-bit Scabious (*Succisa pratensis*) (Fig 103), although neither were yet in flower, Cat's-ear (*Hypochaeris radicata*) (Fig 104), Common Milkwort (*Polygala vulgaris*) (Fig 105), Pignut (*Conopodium majus*) (Fig 106) and Bearberry (*Arctostaphylos uva-ursi*) (Fig 107). On the way back down to the minibus, Martin spotted some Alpine Bistort (*Persicaria vivipara*) with the little bulbils it produces already developing a leaf whilst still attached to the parent plant (Fig 108).

We also spotted two interesting lichens, Map Lichen (*Rhizocarpon geographicum*) (Fig 109) and *Cladonia* sp. (Fig 110), and two butterfly species of interest, the Northern Brown Argus (*Aricia artaxerxes*) (Fig 111) and the Small Heath (*Coenonympha pamphilus*) (Fig 112).

Straloch moraines



Fig 96: The moraines



Fig 97: Common Rock-rose
(*Helianthemum nummularium*)



Fig 98: Creeping Willow
(*Salix repens*)



Fig 99: Small White Orchid (*Pseudorchis albida*) showing flower detail



Fig 100: Intermediate Wintergreen (*Pyrola media*) showing detail of teeth on leaf margin used to differentiate from other Wintergreen species



Fig 101: Heath Fragrant Orchid (*Gymnadenia borealis*)



Fig 102: Slender St John's-wort (*Hypericum pulchrum*)



Fig 103: Devil's-bit Scabious (*Succisa pratensis*)



Fig 104: Cat's-ear (*Hypochaeris radicata*)



Fig 105: Common Milkweed
(*Polygala vulgaris*)



Fig 106: Pignut
(*Conopodium majus*)



Fig 107: Bearberry
(*Arctostaphylos uva-ursi*)



Fig 108: Bulbils on Alpine Bistort (*Persicaria vivipara*)



Fig 109: Map Lichen
(*Rhizocarpon geographicum*)



Fig 110: *Cladonia* sp.



Fig 111: Northern Brown Argus
(*Aricia artaxerxes*)



Fig 112: Small Heath
(*Coenonympha pamphilus*)

Pitarrig meadow, Pitlochry

This second site is a wet heathland habitat (Fig 113) where we expected to find Heath Spotted (*Dactylorhiza maculata*), Northern Marsh (*Dactylorhiza purpurella*) and possibly Early Marsh orchids (*Dactylorhiza incarnata*) together with more hybrid plants.

Just outside the minibus we found Eared Willow (*Salix aurita*) growing (Fig 114), which keeps its stipules rather than having them fall off as tends to happen in other species of willow. It also has lovely tactile rugose leaves.

Once on the site we quickly found examples of Northern Marsh (*D. purpurella*) (Fig 115) and Heath Spotted orchids (*D. maculata*) (Fig 116), before stumbling across a whole host of wonderful Globeflowers (*Trollius europaeus*) (Fig 117). In the wetter areas there were specimens of Round-leaved Sundew (*Drosera rotundifolia*) growing (Fig 119), some with flower-spikes, although no open flowers yet. Heath Fragrant orchid (*Gymnadenia borealis*) (Fig 123) was also found along with Bugle (*Ajuga reptans*) (Fig 120), Cross-leaved Heath (*Erica tetralix*) (Fig 118) and Marsh Thistles (*Cirsium palustre*) (Fig 121). There were also some interesting sedges including the similar looking Deergrass (*Trichophorum cespitosum*) (Fig 124) and Few-flowered Spike-rush (*Eleocharis quinqueflora*) (Fig 125), the former having a bract on its inflorescence and the latter has no bract and the longest glume is at least half the length of the inflorescence. Broad-leaved Cottongrass (*Eriophorum latifolium*) (Fig 126), which is an indicator of base-rich flushes, was also found growing, along with Bog-myrtle (*Myrica gale*) (Fig 122), which had wonderfully scented leaves that can be used as an insect repellent. I also found a caterpillar, although have yet to identify it but could possibly be an Oak Eggar Moth (*Lasiocampa quercus*) (Fig 127).

On the way back to the minibus I spotted Bog Asphodel (*Narthecium ossifragum*), and a few of us were lucky to see a female Crossbill (*Loxia curvirostra*) feeding in one of the conifers nearby.

Pitarrig meadow, Piloehry



Fig 113: The wet meadow



Fig 114: Eared Willow
(*Salix aurita*)



Fig 115: Northern Marsh
Orchid
(*Dactylorhiza purpurella*)



Fig 116: Heath Spotted Orchid
(*Dactylorhiza maculata*)



Fig 117: Globeflower
(*Trollius europaeus*)



Fig 118: Cross-leaved Heath
(*Erica tetralix*)



Fig 119: Round-leaved Sundew
(*Drosera rotundifolia*)



Fig 120: Bugle
(*Ajuga reptans*)



Fig 121: Marsh Thistle
(*Cirsium palustre*)



Fig 122: Bog Myrtle
(*Myrica gale*)



Fig 123: Heath Fragrant Orchid (*Gymnadenia borealis*).



Fig 124: Deergrass
(*Trichophorum cespitosum*)



Fig 125: Few-flowered Spike-rush
(*Eleocharis quinqueflora*)



Fig 126: Broad-leaved Cotton Grass
(*Eriophorum latifolium*)



Fig 127: Possible Oak Eggar Moth Caterpillar (*Lasiocampa quercus*).

Keltneyburn SWT reserve

This was the final site Martin had planned for us, where there was the possibility of seeing eight species of orchid growing including some we had already seen, but also two forms of the Common Spotted Orchid (*Dactylorhiza fuchsii*) and the Early Purple Orchid (*Orchis mascula*). This site is described as 'one of the finest species-rich grasslands in Scotland' by the Wildlife Trusts, and in addition to the grassland also has broadleaved woodland and an old curling pond (Fig 128).

The first find, right next to the car park, was an example of the Common Spotted Orchid (*D. fuchsii*) (Figs 129 & 130), the form that is most commonly found. It wasn't long before the next orchid species was found, this time the Small White Orchid (*Pseudorchis albida*) (Fig 131), and then a third, the Greater Butterfly Orchid (*Platanthera chlorantha*) (Figs 132 & 133). In amongst the orchids and grasses we found Eyebright sp. (*Euphrasia* sp.), Heath Speedwell (*Veronica officinalis*), Tormentil (*Potentilla erecta*) (Fig 135), Germander Speedwell (*Veronica chamaedrys*) (Fig 137), Lesser Stitchwort (*Stellaria graminea*) (Fig 136), Yellow-rattle (*Rhinanthus minor*), Meadow Buttercup (*Ranunculus acris*), Fairy Flax (*Linum catharticum*), and the last few Bluebells (*Hyacinthoides non-scripta*) growing. A little further on we came across the second form of the Common Spotted Orchid (*D. fuchsii*) found on the site, the alpine form, which has the same broad leaves but the flower colour is darker (no photo).

As with some of the other sites we had visited there were possible hybrid plants growing here too, including a Heath Spotted hybrid (Fig 138). The Northern Marsh Orchid (*Dactylorhiza purpurella*) (Fig 139) was the next orchid we came across, followed by a possible Northern Marsh and Common Spotted hybrid (Leaves of the CS but flower colour of the NM, and a spur somewhere in between the two) (Fig 140). Our sixth orchid species was the Heath Fragrant Orchid (*Gymnadenia borealis*) (Fig 141). Before heading into the woodland area Martin pointed out a few more plants found growing in the grassland, including Spignel (*Meum athamanticum*) (Fig 142) with its scented leaves, Lady's-bedstraw (*Galium verum*) (Fig 143), Common Cow-wheat (*Melampyrum pratense*) (Fig 144) (although no Small Cow-wheat (*Melampyrum sylvaticum*) which also grows on the site). Moving into the wooded area (Fig 145) on the way back to the car park we found Yellow Pimpernel (*Lysimachia nemorum*) (Fig 146) growing, and our seventh and eighth orchid species, Bird's-nest Orchid (*Neottia nidus-avis*) and Common Twayblade (*Neottia ovata*).

Other species of interest we spotted were the Yellow Shell moth (*Camptogramma bilineata*) (Fig 147) and Chimney Sweeper moth (*Odezia atrata*) (Fig 148), a Tree Pipit (*Anthus trivialis*), and numerous black slugs (Fig 149) and grasshoppers.

Keltneyburn, SWT reserve



Fig 128: Keltneyburn



Fig 129: Common Spotted Orchid (*Dactylorhiza fuchsii*) showing flower detail



Fig 130: Leaf detail of Common Spotted Orchid (*D. fuchsii*)



Fig 131: Small White Orchid (*Pseudorchis albida*)



Fig 132: Greater Butterfly Orchid (*Platanthera chlorantha*) showing flower detail



Fig 133: Greater Butterfly Orchid (*P. chlorantha*) with slanting pollinia



Fig 134: Lesser Butterfly Orchid (*P. bifolia*) with parallel pollinia



Fig 135: Tormentil (*Potentilla erecta*)



Fig 136: Lesser Stitchwort (*Stellaria graminea*)



Fig 137: Germander Speedwell (*Veronica chamaedrys*)



Fig 138: Possible Heath Spotted hybrid



Fig 139: Northern Marsh Orchid (*Dactylorhiza purpurella*)



Fig 140: Possible hybrid between Common Spotted and Northern Marsh (Leaves of the CS but flower colour of the NM, and a spur somewhere in between the two)



Fig 141: Heath Fragrant Orchid (*Gymnadenia borealis*), showing detail of flower including long thin spur. Also showing the ovary twisted 180° as is typical in many orchids.



Fig 142: Spignet (*Meum athamanticum*)



Fig 143: Lady's-bedstraw (*Galium verum*)



Fig 144: Common Cow-wheat (*Melampyrum pratense*)



Fig 145: Birch woodland



Fig 146: Yellow Pimpernel (*Lysimachia nemorum*)



Fig 147: Yellow Shell Moth
(*Camptogramma bilineata*)



Fig 148: Chimney Sweep Moth
(*Odezia atrata*)



Fig 149: One of the many
Black Slugs we saw.

Aberfeldy

Our final site of the day was in fact not one on Martin's schedule but rather a site suggested by Fergus Crystal, one of the course participants, who's family happened to live near Aberfeldy and had a meadow full of Northern Marsh Orchids (*Dactylorhiza purpurella*) (Fig 150). Fergus wanted advice from Martin on how to manage the site further to enhance it's value in terms of wild flowers, and in particular the orchids. The orchids themselves were an amazing site and much more vigorous than previous examples we'd seen, probably down to the soil being richer (Figs 151, 152, 153). The grass itself was also a lot more vigorous (Fig 154) and so Martin recommended that it would be beneficial to get some cattle in to graze the field outside of the orchid growing season. A couple of other plants of interest I spotted were Crosswort (*Cruciata laevipes*) (Fig 155), Ragged Robin (*Lychnis flos-cuculi*) (Fig 156) and Meadow Vetchling (*Lathyrus pratensis*) (Fig 157).

Aberfeldy



Fig 150: View from the meadow.



Fig 151: Lots of Northern Marsh Orchids (*Dactylorhiza purpurella*)



Fig 152: Close-up of one fine specimen



Fig 153: One of the tallest orchids we found



Fig 154: The vigorous grass sward



Fig 155: Crosswort
(*Cruciata laevipes*)



Fig 156: Ragged Robin
(*Lychnis flos-cuculi*)



Fig 157: Meadow Vetchling
(*Lathyrus pratensis*)

Conclusion

Attending both of the courses has enabled me to study many more of our native British Orchids than I had previously come across. I feel I now have a much better understanding of the differences between some of the species that on first glance appear very similar, in particular the *Gymnodenia* and *Dactylorhiza* species. Seeing them grow in their native habitats has also allowed me to better understand what conditions each prefers to grow in. This is all useful information when considering cultivating some of the species in a garden setting. I am now working in a private garden that has meadow areas which I hope to develop, including introducing orchids in some areas. Following on from the conversations I had with Celia Wright in Scotland, I have located local populations of *Dactylorhiza fuchsii* and will therefore use this species as a starting point.

Celia also mentioned that the Hardy Orchid Society present a workshop on the techniques used in growing orchids from seed each year. I attended the workshop in August, and now have some *Dactylorhiza praetermissa* seed germinating and developing into protocorms (seed from the HOS stock of donated seed). I have also collected seed from the local population of *D. fuchsii* with permission from the landowner, and hope to try germinating it in the near future.

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