

# The natural history of British orchids

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The speaker has been mainly a bird watcher (since 1961) but as he has added many birds to his list, he started looking at plants, particularly orchids, and he does have a degree in biology (1976). His talk was in 2 sections, the first dealing with the biology of orchids and the second a selection of his photographs of UK orchids.

## The biology of orchids

With leaves like grass leaves, the plants themselves are very ordinary but the flowers are remarkable. Orchids are monocots with parallel veins in lanceolate leaves and have double fertilisation, like angiosperms. The flowers have 3 petals and 3 sepals with a highly modified petal known as the labellum, on which the insects land. There are fixed stamens and carpels and the plant is resupinate (ie the flower hangs upside down). They have extremely small seeds about the size of pollen grains and have no nutrition in the seed. They are symbiotic with fungal partners.

The most obvious economic uses are the use of vanilla as food flavouring and in perfumes and the flower trade as house plants.

Orchids occur in all parts of the world except Antarctica and the high Arctic. There are 25-28,000 species, which compares with Dicotyledons (200,000), monocotyledons (60,000), mushrooms (16,000), mosses (15,000), ferns and their allies (13,000), lichens (10,000), red algae (6,000), green algae (4,000), brown algae (3,000) and gymnosperms (1,000).

With the earth at 4.5 billion years old, life first developed as single-celled organisms, with eukaryotes developing at about 2.5 billion years, multicellular life at 1.5 billion, the earliest sexual reproduction at 1.2 billion years and the Cambrian explosion of all the species at 600 million. Vascular plants developed first followed by seed plants and flowers with orchids the latest group to evolve.

They are monocots with one cotyledon, in 3 parts with parallel leaf veins; the pollen grain has one pore or furrow and there are vascular bundles throughout the stem and ground issue.

## Structure

There is nothing remarkable about the chromosomes.

Root and stem are monopodial or sympodial and aerial roots are very important for a lot of orchids, especially in the tropics, where they collect nutrition from insects as they have no nitrogen-fixing.

Leaves are simple, alternate, with parallel veins and no stipules. Some do not have leaves.

**Nutrition** is by photosynthesis of two types which have evolved independently over and over in the plant kingdom, and symbiosis with mycoheterotrophy. No orchid can germinate without a fungal partner and the seed has to land near the appropriate fungal partner. The orchid seems to gain more from the association than the fungus. They associate with more than one species of fungus.

**Flowers** are very diverse but they all conform to a similar pattern with 3 sepals and 3 petals, one of which is highly modified as the labellum, which provides the landing stage for insects. The stamen and stigma are together as a column and they have one anther (a suppressed anther). The ovary is below the column. Some develop a spur with part of the labellum developing into an elongated hollow spike extending behind the flower, containing nectar, which is sucked by long-tongued animals. The rastellum is a membrane that prevents self-pollination.

**Pollination** is mainly by insects, but there is one humming bird and 3 bats that pollinate orchids. Their reward is nectar. Deception is common, as in the bee orchid and some orchids provide no nectar. While there are 5 million insect species, a lot of orchids need a single species for pollination. The vanilla orchid originated in Mexic, where it was fertilised by a small Mexican bee

but it is now grown in the Far East since the development of manual fertilisation. The expansion of insects in the Cretaceous period enabled the expansion of flowering plants, including orchids. After fertilisation, the ovary forms a pod containing thousands of pollen-grain sized seeds and germination needs fungi after dispersal by wind.

## UK orchids

The world has 28,000 species of orchids but there are only 56 species in Britain and Ireland. They seem to like poor soils, many of them on chalk and they do not last long, only 3 days or so for many. The speaker's photographs of UK orchids, taken as single frames from videos to get the best image, included:

- Lady's Slipper Orchid (*Cypripedium calceolus*), of which there is possibly one plant in all the UK.
- Red Helleborine (*Cephalanthera rubra*), the only one in the UK, which is surrounded by a cage in an undisclosed location in the Chilterns.
- White Helleborine (*C. damasonium*), an uncommon orchid which, being white, attracts moths at night.
- Common Twayblade (*Neottia ovata*), which grows out of leaf litter in woods.
- Bird's Nest Orchid (*N. nidus-avis*), which is completely parasitic, having no leaves and is found in beech woods.
- Broad-leaved Helleborine (*Epipactis helleborine*), one of the commonest orchids, which is pollinated by wasps; It is found at the Welsh Harp and locally in Harrow.
- Green-flowered Helleborine (*E. phyllanthus*), a smelly orchid found in the Chilterns.
- Violet Helleborine (*E. purpurata*).
- Narrow-lipped Helleborine (*E. leptochila*).
- Autumn Lady's Tr4esses (*Spiranthes spiralis*), usually flowering in the first week of September on chalk.
- Musk Orchid (*Herminium monorchis*) found in the Chilterns.
- Man Orchid (*Orchis anthropophorum*).
- Monkey Orchid (*O. simian*).
- Lady Orchid (*O. purpurea*).
- Military Orchid (*O. militaris*).
- Early Purple Orchid (*O. mascula*).
- Lesser Butterfly Orchid (*Platanthera bifolia*), found in the New Forest.
- Greater Butterfly Orchid (*P. chlorantha*), a smelly orchid, which almost glows at night and is pollinated by moths.
- Common Fragrant Orchid (*Gymnadenia conopsea*), found in the Chilterns.
- Common Spotted Orchid (*Dactylorhiza fuchsia*), one of the commonest orchids; hybridisation of the various species of *Dactylorhiza* is common.
- Early Marsh Orchid (*D. incarnata*).
- Southern Marsh Orchid (*D. praetermissa*), found at the Welsh Harp.
- Heath Spotted Orchid (*D. masculata*), found on Stanmore Common.

- Pugsley's Marsh Orchid (*D. raunstinerooides*), which is very rare.
  - Frog Orchid (*D. viridis*), found in the Chilterns.
  - Burnt Orchid (*Neotinea ustulata*).
  - Lizard Orchid (*Himantoglossum hercinum*), found at Sandwich; it smells of goats.
  - Pyramidal Orchid (*Anacamptis pyramidalis*), found on chalk.
  - Green-winged Orchid (*A. morio*).
  - Fly Orchid (*Ophrys insectivore*), fertilised by the male digger wasp.
  - Bee Orchid (*O. apifera*).
  - Late Spider Orchid (*O. fuciflora*).
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### **Addendum by the editor**

Derek illustrated his talk with picture of orchids.

In order to illustrate this article, I have added here a selection of my own orchid photographs.

Two orchids can be found on Stanmore Common. These are Broad-leaved Helleborine and Heath Spotted Orchid.

The marsh helleborine is, as the name suggests, found in marshy ground, but is relatively uncommon.

The others are often to be found on chalk downland, in this case from the Chilterns and the Isle of Purbeck. Some of the Chiltern species are extremely rare. These are the fly, monkey, military and lady orchids, and are in protected sites.

[Photographs of Orchids](#)