



Penny Sarchet is New Scientist's news and digital director. She is a former plant scientist and a lifelong birdwatcher. You can sign up to her free monthly newsletter at newscientist.com/wildwildlife

Penny's week

What I'm reading

The Tree in My Garden, *Kate Bradbury's guide to choosing and planting the right tree for you and for wildlife*.

What I'm watching

Unsurprisingly, Wild Isles, the BBC's latest wildlife documentary. The Eurasian hobbies catching dragonflies in flight were my favourite.

What I'm working on

A feature about rediscovering long-lost species. Look out for it next month!

Up next week:
Chanda Prescod-Weinstein

Wild Wild Life

Blooming marvellous Orchids seem unique in how they inspire such a devoted following, but why are there so many species of these much-loved plants, wonders **Penny Sarchet**

THE announcement of a newly recognised orchid species in Japan prompted discussion among our UK news team recently. *Spiranthes hachijoensis* is undoubtedly beautiful, and it is always surprising to hear of new species in well-studied countries. But I couldn't help being slightly cynical about this one, which is very similar to another known species, but not as hairy.

My cynicism has its roots in the great divide between lumpers and splitters: the tendency among taxonomists and natural historians to prefer either to classify similar organisms as a single species or to split them up into multiple distinct ones. There are good arguments in favour of each approach, but the orchid family, which may be the largest plant family in the world, provides ample opportunity for splitting to run wild. For example, depending on your philosophy, there could be as many as 529 species of orchid in Europe – or only 102.

Nevertheless, Orchidaceae is an extraordinary family and may account for a tenth of all seed-producing plants. It boasts a staggering number of species, at around 25,000, and includes some of the most beautiful, startling and cunning flowers in existence. One member of this family is *Vanilla planifolia*, the source of vanilla, one of the world's favourite flavourings.

The huge number of orchid species isn't just the work of splitters, it also reflects an incredible range of different forms. This can feel surprising – we tend to think of orchids as delicate and rare, but they are also diverse and widespread. Why is this the case?

One person to ask this question was orchidologist

Calaway Dodson, who, in 2003, tackled the issue of why there are so many orchid species in Ecuador in particular. He noted that Ecuador is the smallest country in the Andes, but that more than 3700 species of orchid had been recorded there, and proposed a number of features of orchids that may contribute to their ability to rapidly diversify into new species. Seeds were one of these: orchids produce a very large number of tiny, wind-disseminated seeds, providing plenty of scope to spread large distances and grow in new places.

Some of Dodson's other suggestions were later supported by a 2015 study that used genetics

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and fossils to probe orchids' family tree and evolutionary history and to identify physical innovations that coincided with times of significant diversification. One of these was epiphytism, the tendency of many orchids to grow on trees. It could be that the diversity of habitats provided by tree branches and holes encouraged the evolution of new species that were well adapted to these common and under-exploited surfaces.

Another of Dodson's suggestions that was borne out by the analysis was deceit pollination, a practice employed by a large number of orchids where they mimic the mate of their specific pollinator, both in appearance and through the release of compounds that make them smell like a particular bee, for example. This is

a highly effective way of ensuring pollination, but it probably works best when mimics are rare so that pollinators aren't deceived too often. It is possible that this therefore drives the evolution of new orchid species that target other pollinator species, to avoid them catching on. It seems to work – there are several hundred species of the *Ophrys* genus of Mediterranean bee orchids.

Orchids don't stop there. Several other factors may contribute to their outstanding ability to speciate, including having CAM metabolism, a form of photosynthesis that enables plants to accumulate carbon dioxide at night and shut their pores during the day, which is beneficial in dry environments. We can probably also thank the evolution of pollinia, highly specialised little packets of pollen that orchids position very precisely on specific pollinators to ensure targeted pollination.

The end results of all this are some of the world's most loved flowers. Orchids seem unique in how they inspire such a devoted following: there are more than 40 orchid societies in the UK alone.

The thrill of seeing orchids in the wild is very special indeed and you don't need to travel to the tropics to see them – there are about 200 species in North America and around 50 in the UK. My first were bee orchids in Portugal's Algarve region, but the common spotted orchids that I subsequently saw growing at Loch Lomond in the UK, surrounded by frogs, really spring to mind. In temperate northern hemisphere countries, orchids are beginning to flower now. Do get out to see them if you can, but be careful to stick to paths, as it is easy to crush orchids that haven't flowered yet without ever realising. ■