

## Subspecies- a problem or a challenging insight?

When we go out birding we generally find that we can identify many of the birds we meet by a simple process of recognising “key features” which make that species distinctive. Birds are individuals, just like people and they show some degree of variability within the standard plumage types. Amongst the House Sparrows at my feeders some may be a bit browner, some a bit greyer, some more boldly marked, others less so. These differences can be age related or linked to the timings of seasonal moults, but they all add up to ‘*Passer domesticus*’!

However, if these differences are consistent throughout a population and re-appear in subsequent generations then we should give some thought to what they mean in the wider picture. Consistent differences in a discrete population lead over time to the emergence of a new species, a process known as “speciation”.

Biologists recognise two main types of speciation, sympatric and allopatric. Sympatric involves the emergence of a new species from within an existing population as a result of the exchange of genes and the persistence of random mutations. For a number of reasons it primarily affects plants and is the process which gave rise to the development of Common Cord Grass, *Spartina anglica* during the late nineteenth century, from the hybridization of Small Cord Grass *S.maritima* and Smooth Cord Grass *S.alternifolia*, an alien invader from North America.

Allopatric speciation is the principal (but not the only) process affecting animals and especially vertebrates. It involves the isolation of part of a population from the main range, for instance an island, mountain range, river or desert.

Europe is a particularly interesting place to see the allopatry and its consequences. Successive Ice ages left many species isolated with southerly distributions, while post-glacial warming resulted in some of these populations effectively stranded in high mountain refuges. This accounts for the presence of Ptarmigan in Scandinavia, Scotland, but also in the Pyrenees between France and Spain. Until 5000 years ago Britain was part of the continent of Europe, joined by the vast lowland known today as ‘Doggerland’. Similar coastal plains filled much of the Irish Sea and coasts of western Scotland. Effectively the vertebrate populations of Britain and Northern Europe were one and the same, with nothing preventing a Red Squirrel from the Alps making an epic tree-top trek all the way to Caithness, with nothing to prevent it except for Pine Martens, Goshawks and Eagle Owls!

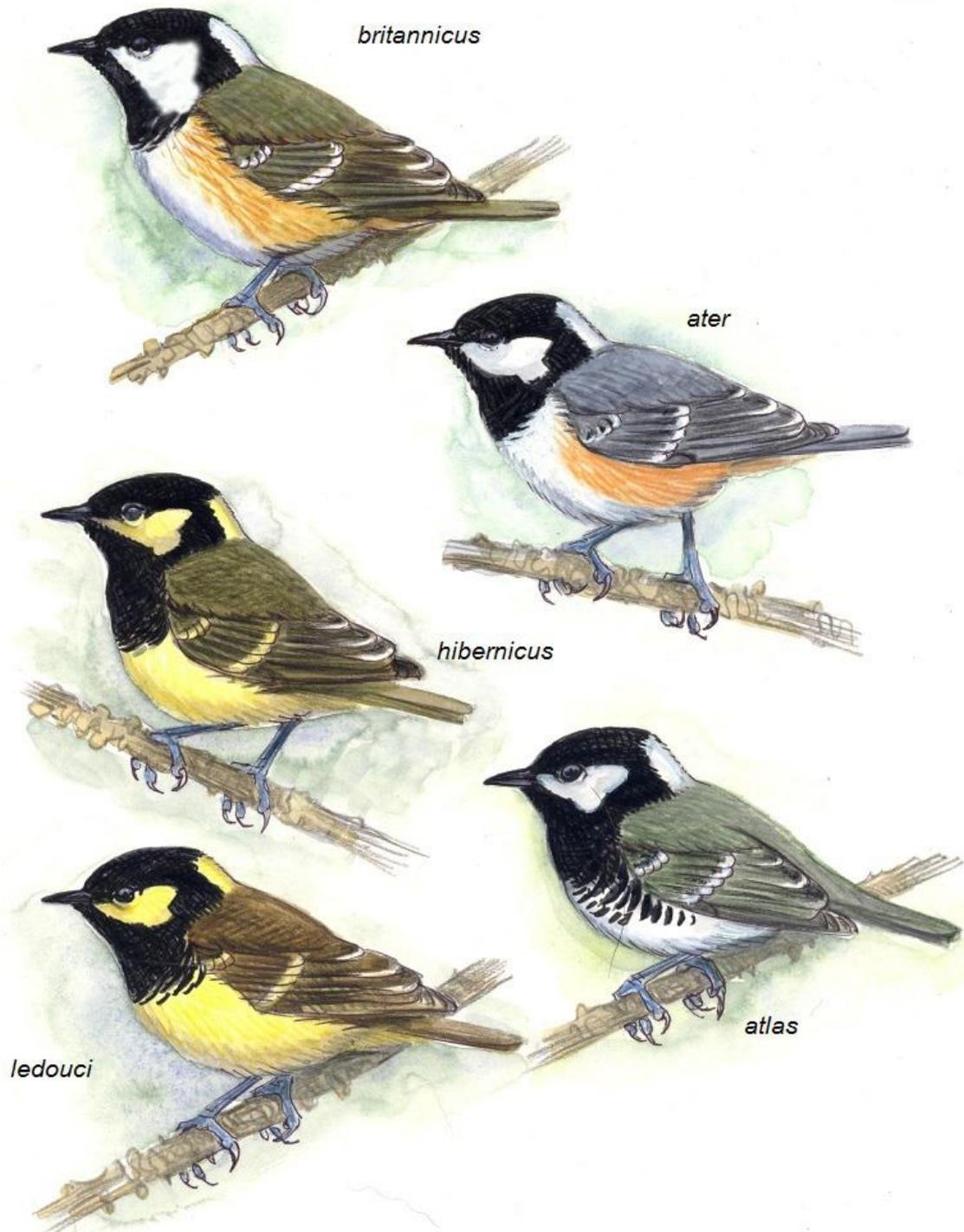
But all that changed; a process known as isostatic rebound, coupled with post-glacial climatic amelioration, effectively isolated the British Isles from the rest of Europe and provided ideal conditions for allopatric speciation. Of course, this does not affect all species equally. Highly mobile and adaptable species are able to travel across distances and maintain contact with isolated groups of their congeners. Many smaller species are essentially sedentary. Once a pair establishes a breeding territory they seldom move very far from home. To minimise competition for territories many species adopt a strategy of post-juvenile dispersal, where their offspring set off into the wide blue yonder to seek their fortune elsewhere. Sadly, for most, this results in an early death through starvation or predation. Dispersal is essentially randomly orientated and is usually driven by a temporal stimulus, so that birds keep travelling in their chosen direction until ‘they run out of steam’. By contrast, migration involves regular seasonal movements between generally fixed destinations, repeated in subsequent seasons.

The consequences for us are simple and yet at the same time complex. Where populations are isolated through many generations’ small genetic inconsistencies and acquired mutations can add up to individuals which are recognisably different to an acute observer. A good example is the Coal Tit *Periparus ater*, a species I know well from prolonged contact in the Pine woods of Breckland and mid-Wales. They are also regular visitors in autumn and winter to my bird feeders in East Kent. Coal tits are essentially conifer specialists, they have a longer bill than other similar sized titmice and are adept at winking *Adelgids*, *Aphids* and beetle larvae from the needle clusters. Conifers provide lots of food like this in summer, but in winter time it can be harder to find and many Coal tits opt to raid bird feeders for sunflower seeds and peanuts. They are not truly a migrant, but are a good example of a species where post-juvenile dispersal is a feature of their biology. Species where the volume of dispersal is correlated with food supply are usually termed ‘irruptive’ as we see in Crossbills and Jays and also in Coal tits.

Five millennia of isolation have left ‘British’ Coal tits subtly different from ‘Continental’ ones. They tend to be more olive on the mantle compared to their blue-grey continental cousins. This gives rise to the trinomial names, *Periparus ater ater* for the Continental race, *Periparus ater britannicus* for the British race. Continental birds dispersing from the woodlands of northern Europe frequently find their way into southern Britain and one such is currently making lightning raids on my sunflower feeders



***Continental Coal Tit***, a first year bird  
ringed at Dunes du Fort Vert, Marck,  
Pas-de-Calais on 1/10/15 and  
controlled at Shuart on 7/10/15.  
by Chris Hindle



*Coal Tit subspecies*

The situation in Britain is a little more complicated. At the Calf of Man Bird Observatory in the northern Irish Sea dispersing Coal tits are a feature of autumn. Given that the island is pretty well equidistant between Ireland, Scotland and England it is no surprise that dispersing Coal tits appear in the mist nets, but among them are occasional Irish Coal Tits *P.a.hibernicus* with their distinctly different plumage of browns and yellow. Strange to say, but in the mountain forests of Tunisia there is a rather similar looking race *P.a. ledouci*, where isolation in a damp montane environment appears to have favoured a similar set of genes. Most striking of all is the race which occurs farther west in the Atlas Mountains of Morocco, *P.a. atlas*. This relatively small population was apparently isolated a long time ago and is strikingly different from the other races, with a paler greeny-grey mantle and very extensive black on the breast extending along the flanks. I heard a couple of birds call and to my ears they seem similar to familiar birds back home, but the race appears to have adapted to Holm Oak forest which may well account for its distinctive appearance. In the past the outward appearance of birds was the way species and sub-species were judged. I have a great little book published in 1923 ; "Birds of Europe and North Africa" by Col.R.G. Wardlaw Ramsey. This has no pictures, but it is full of descriptions and measurements of all the races of species known at the time. Some were a bit conjectural, a few even fanciful, but many are worth closer scrutiny today. These days we are lucky to be able to consider many other isolating mechanisms, such as analysis of songs and calls, behavioural and display strategies and even timing

of breeding. Modern digital cameras allow critical scrutiny of fine details of birds in the field and we can to some extent confirm our observations by analysis of DNA.

Subspecies have rightly been described as “steps on the pathway to the evolution of a new species”. In an uncertain world that pathway can change or end abruptly for any number of reasons. Being able to recognise some of them in the field can only enhance our enjoyment and understanding of these marvellous creatures.

For those interested in finding out more about speciation affecting birds in Britain and Europe I can recommend “ An Atlas of Birds of the Western Palearctic” by Colin Harrison, published by Collins in 1982, but sadly now out of print.

**Norman McCanch**