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Red Squirrels on the Sefton Coast

A study of the effect of supplemental feeding.

Article by Dr Craig Shuttleworth

The size and productivity of any red squirrel population is largely governed by the availability of natural foods. Squirrels eat a wide range of different foods including the buds and flowers of trees, fungi, birds eggs and insects; however, it is tree seeds which make up the bulk of the diet.

As a consequence, the best type of red squirrel habitat contains a mosaic of different tree species. This means that in any particular year there should always be at least one species of tree which is producing large quantities of seed. Although red squirrels are found in both deciduous and coniferous woodlands, they reach the highest population densities in conifers especially in areas with a large pine component. This is one of the reasons why the animals are numerous in the coastal pine woodlands.

A detailed research programme began four years ago in an attempt to better understand the factors which influence the population dynamics of the local red squirrels. In particular, to what extent did supplemental feeding affect the animals.

Over the last decade it has been increasingly popular to feed red squirrels. There is no doubt that this encourages them onto garden bird tables where people can enjoy their acrobatic antics. The general consensus amongst householders is that this extra food has increased the numbers of squirrels, allowed them to live longer and to produce more babies. Recent media articles have played on this in an attempt to encourage a 'greater awareness' of the red squirrels national plight.

The research in Formby has shown that although this extra food does produce a modest population increase, there are



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many costs. My research found that the majority of adult females don't breed, and those that do produce litters which are smaller than would be expected elsewhere. Around a third of the young animals die before leaving the nest, and in some years only a small fraction of those which wean actually get to stay in the population. This type of breeding suppression is typical in many mammal populations during years when there is a high population density.

Within the Sefton woodlands, supplemental feeding has not prevented population fluctuations. Earlier studies in northern England have shown that in the absence of tree seeds and other natural foods supplemental feeding has failed to prevent a sharp population decline. In Formby, it is the availability of pine cones and deciduous seeds which is of fundamental importance in governing diet, behaviour, and ultimately the size of the population.

When pine seed is scarce, the squirrels will include more peanuts in the diet; however, they also incorporate more alternative natural foods such as fungi and the buds and flowers of trees. Peanuts, sunflower seeds, wheat and maize, although a high energy mix, contain a high ratio of phosphorus to calcium. It is likely that this type of nutritional imbalance is one factor restricting the maximum volume of peanuts which the animals will consume. Interestingly, a diet consisting entirely of artificial foods has been shown to cause osteoporosis in captive animals. Squirrels with the symptoms of bone disease are occasionally found in Formby.

The results of the study have shown that supplemental feeding has:

- Provided an additional high energy food source.
- Increased the population size, but raised the level of competition for supplemental foods, and as a result, led to greater competition for natural foods which are limited in their abundance.
- Reduced reproductive output whilst increasing the potential for the transfer of disease and parasites between animals.
- Not prevented population fluctuations or reduced the threat of a population crash following the exhaustion of the tree seed crop.

Craig Shuttleworth obtained his doctorate from the University

of London in 1996 for his thesis, "The effect of supplemental feeding in the Red Squirrel (*Sciurus vulgaris*)".

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