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## David Lack's theory of limiting factors

To understand breeding strategies, population declines, population increases or stability, one needs to understand *limiting factors*. The British thinkers Thomas Malthus and Charles Darwin noted that no population of animals goes on increasing without limit. Many factors can limit animal populations, and a population can be held down (limited) by more than one factor. Krebs (2001) said a factor was limiting if a change in this factor produced a change in the density of the animal's population. Food and disease are commonly recognised limiting factors – one would expect fewer Powerful Owls in areas with fewer possums or fruit bats than in areas with an abundance of these prey, evidence that food is limiting. If rabbit populations are low in one area where the myxoma virus was introduced, and high in an area without myxomatosis, this disease may be a limiting factor. If the Dingo *Canis lupus* is shot and trapped in one area, and fox *Vulpes vulpes* numbers increase, Dingos may be holding down fox numbers. Food and nest sites are said to be the main limiting factors for raptors (Newton 1979), and this can be tested experimentally. If nest boxes are added to an area and the number of breeding owls increases, then nest sites, more than food, are limiting.

David Lack, the prominent British ornithologist, was born in London in 1910 and was a teacher until 1940. He was interested in the ways animal populations are limited, and how their numbers stay roughly the same each year even though breeding pairs spawn many young.