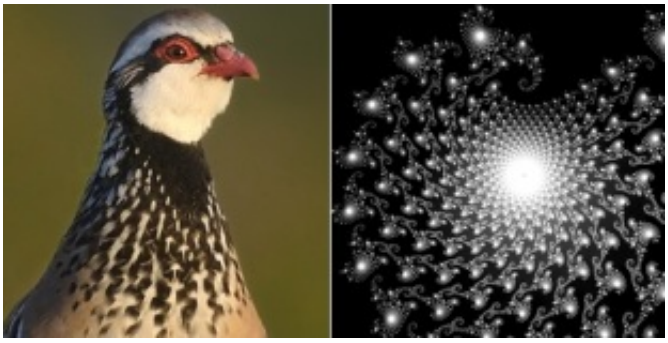
Fractal plumage indicates bird fitness

January 24 2013



Red legged Partridge and fractal pattern. Credit: Hans Hut and Wolfgang Beyer

The complexity of the fractal geometry of a bird's plumage reveals its level of fitness, according to a new study published in *Proceedings of the Royal Society B* today.

Coloured traits play key roles in animal communication. Often, these traits consist in complex colour patterns (spotted, stripped or irregular colourations) that are difficult to describe with standard tools. Lorenzo Pérez-Rodríguez and his team tried using fractal geometry, which was developed to describe fractals, mathematical objects characterized by their complexity and self-similarity when observed at different scales, in order to analyse bird plumage.

The Spanish scientists studied the black bib patterns of 68 red-legged partridge (Alectoris rufa) and found that a higher bib fractal dimension predicted better individual body condition, as well as immune

responsiveness. Moreover, when food intake was experimentally reduced as a means to reduce body condition, the bib's fractal dimension significantly decreased, which could be perceived by potential mates and rivals. Fractal geometry, therefore, provides new opportunities for the study of complex animal colour patterns and their roles in animal communication.

More information: Perez-Rodriguez, L., Jovani, R. and Mougeot, F. Fractal geometry of a complex plumage trait reveals bird's quality, *Proceedings of the Royal Society B*. dx.doi.org/10.1098/rspb.2012.2783

Provided by The Royal Society