Genetic signature of anthropogenic population collapse in orang-utans

Abstract

Great ape populations are undergoing a dramatic decline, which is predicted to result in their extinction in the wild from entire regions in the near future. Recent findings have particularly focused on African apes, and have implicated multiple factors contributing to this decline, such as deforestation, hunting, and disease. Less well-publicised, but equally dramatic, has been the decline in orang-utans, whose distribution is limited to parts of Sumatra and Borneo. Using the largest-ever genetic sample from wild orang-utan populations, we show strong evidence for a recent demographic collapse in North Eastern Borneo and demonstrate that this signature is independent of the mutation and demographic models used. This is the first demonstration that genetic data can detect and quantify the effect of recent, human-induced deforestation and habitat fragmentation on an endangered species. Because current demographic collapses are usually confounded by ancient events, this suggests a much more dramatic decline than demographic data alone and emphasises the need for major conservation efforts.