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**mammals**



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# The State of Britain's Mammals 2008

Written by David Macdonald  
and Dawn Burnham

**WILDCRU**  
Wildlife Conservation Research Unit



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### Genetic analyses of badger populations

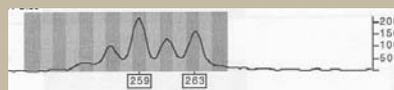
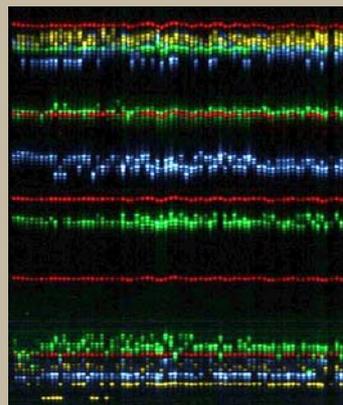
The findings of the Randomised Badger Culling Trial (RBCT) relied on knowledge of the ecology of the badger. Recent advances in molecular genetic techniques have enhanced this knowledge insofar as it has been possible only recently to determine the mating system and social structure of the European badger, through the use of microsatellite loci. Microsatellite loci are used in genetic fingerprinting (see box) which enables determination of who an individual's parents are, and the relatedness of individuals.

Two studies<sup>53,54</sup> in high-density badger populations, have shown a polygynandrous mating system: males mate with more than one female, and females mate with more than one male. Within social groups more than one male and more than one female may breed. Indeed, individuals do not always breed with mates from the same social group – around half of the cubs in these high-density populations were sired by males from outside the cub's group. These extra-group paternities were assigned primarily to males from neighbouring groups (see map). This suggests a high level of contact between badgers in different social groups, which has implications for the spread of diseases such as *Mycobacterium bovis* (which causes TB).

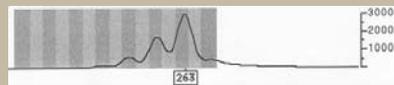
Using genetic data researchers from WildCRU have also shown that one third of group members are more likely to be full-siblings or parent–offspring than to be unrelated<sup>55</sup>. Social groups therefore consist of closely and more distantly related individuals. Additionally, badgers within a

social group and in neighbouring groups, are more closely related than you would expect by chance. This leads to clustering of relatives within social groups and between neighbouring groups, the latter probably results from the high levels of paternity gained by neighbouring males.

Genetic studies can help explain the effect that culling has on badger social groups. One such analysis revealed an increase in badger movement as a result of the RBCT culling, at the genetic level<sup>56</sup>. Furthermore, badgers infected with *M. bovis* tended to move further than uninfected individuals. Detailed research into the intricacies of individual badger life histories enhances our understanding of badger societies and informs future work on the control of TB in cattle.



Cub with alleles 259 & 263



Adult female with alleles 263 & 263

### Extra-group paternity

The map shows the colour-coded badger social groups in Wytham Woods, Oxford. An arrow points from the father's social group to the cub's group, with the size of the arrow representing the number of assigned paternities.



### Genetic fingerprinting

Microsatellites are short sequences of DNA that vary in length. Each individual has two copies, or alleles, of each microsatellite. These alleles can be labelled with a fluorescent dye and run through a gel to determine their size (see picture above). This works on a similar basis to colour chromatography – shorter alleles run through the gel quicker than longer alleles and appear lower down. Individuals inherit one allele from their mother and one from their father. In the graphs (above) both the adult female and the cub have an allele of the same length (263). The adult female could therefore be the mother of the cub. By looking at whether the cub has alleles of several microsatellites in common with other badgers in the population we can work out who its mother and father are.

### New Bovine TB Eradication Group for England

Defra and the English Cattle Industry have agreed to form a joint group to advise the government on developing a plan for reducing the incidence of bTB from cattle in England and moving towards eventual eradication. The Bovine TB Eradication Group<sup>57</sup>, which will include representatives from Defra's Food and Farming Group, Animal Health, the farming industry and the veterinary profession, will also draw on the advice of the European Commission's TB Task Force, which will be invited to visit Britain in early 2009. The group will look at the options

available to address infection and transmission in cattle and wildlife, including the use of vaccination in cattle and badgers. It will consider any exceptional circumstances or new scientific evidence that relate to the established policy on badger culling, recognising that the terms of this policy are currently subject to judicial review. The group will also assess options to help farmers in high incidence areas maintain viable businesses when under disease restrictions. The group will aim to develop a series of measures that can be submitted to the European Commission for approval as part of a formal eradication plan.

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# People's Trust for Endangered Species

Seven years ago, People's Trust for Endangered Species began to focus particular attention on conserving wild mammals and their habitats throughout the British Isles by creating a special fund called Mammals Trust UK (MTUK). Through this fund we support and commission practical conservation research and we raise awareness by involving people in conserving mammals. We work in partnership with other voluntary organisations, wildlife experts, government and industry. Our aims in conserving our wild mammal populations are:

- to raise funds for research and practical conservation based on sound scientific understanding
- to increase public awareness, bring together those with an interest in mammal conservation and share knowledge
- to create opportunities for people to participate actively in mammal monitoring and conservation projects across the UK
- to manage key conservation sites to protect them for the future and to create opportunities for education, recreation and enjoyment of our natural heritage.

People's Trust for Endangered Species, 15 Cloisters House, 8 Battersea Park Road, London, SW8 4BG  
020 7498 4533, enquiries@ptes.org, www.ptes.org

## WildCRU

The Wildlife Conservation Research Unit's mission is to undertake original research on aspects of fundamental biology relevant to solving practical problems of wildlife conservation and environmental management.

WildCRU, Department of Zoology, University of Oxford, Tubney House, Abingdon Road, Tubney, Abingdon, OX13 5QL  
Tel: 01865 393100, Fax: 01865 393101 wcrucru@zoo.ox.ac.uk, www.wildcru.org

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