

# Scientists 'settle' sex controversy

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DEER ensure the survival of their species by adjusting the sex of their offspring, biologists have claimed in new research which they say settles a 30-year scientific controversy.

The reproductive trait, which is shared by other hoofed mammals such as sheep and zebras, results in the healthiest and fittest females producing male rather than female young. By contrast, other, less favoured females tend to produce female offspring.

The phenomenon occurs in species where a few dominant males monopolise all the mating with females in their herd, according to scientists at Edinburgh and Oxford universities.

Scientists have previously established such a trait in bees, wasps and some birds, but have failed to agree that it can also occur in mammals.

The new study claims to prove that the strongest females produce male offspring to ensure there were similarly high-quality males to become the next generation's studs in the mating process.

The researchers, whose work will be published next week in the journal *American Naturalist*, said it was the first conclusive proof of the process, which has been fiercely contested by scientists since the 1970s.

Dr Stuart West, a research fellow at Edinburgh University's Institute of Cell, Animal & Population Biology, said the trait was most acute in species where the fewest males monopolised mating, such as deer and bison.

He said it also occurred to a

lesser extent in other plant-eating, hoofed mammals, or ungulates, such as reindeer, moose and gazelle. However, the trait was least marked among this group in sheep and zebra.

A study of Soay sheep on St Kilda, west of Lewis, showed that ewes are highly promiscuous, copulating with a large number of rams.

Dr West said females in the best condition produced male offspring because they were larger and took more effort.

He said scientists did not understand how this process happened, although they believed it could involve hormonal manipulation.

The research involved re-assessing 73 previous studies, some containing apparently contradictory results. This flurry of research papers followed Robert Trivers, an American biologist, first mooted the theory 30 years ago in work.

The review concluded there was a consistent trend in the pattern of higher-quality females producing male offspring. It also confirmed the trait was more extreme where the mating monopoly was controlled by the fewest males.

Dr West said: "There has been a lot of doubt on this issue for many years, but we've cleared it up by reviewing the vast amounts of data collected over the years. Whilst the physiology that allows this isn't known, it is clear that strong mothers do produce sons."

Dr West said there was general agreement that a variation on the trait occurred in some birds. Here, high-quality male offspring were favoured for their better genes and greater propensity to help feed their own young, he said.