

Scent marking: The mammalian equivalent of showy plumage

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It's the smell, that attracts females when choosing their partner. Credit: Kerstin Thonhauser / Vetmeduni Vienna

The smell of urine may not strike people as pleasant, but female mice find it as attractive as cologne. Researchers at the Konrad Lorenz Institute of Ethology of the University of Veterinary Medicine Vienna have confirmed that male house mice that excel at scent-marking their

territory also have more offspring. This is likely because mouse females are able to infer mate quality from the males' scent mark deposits. The findings are reported in the *Journal of Animal Behaviour*.

Many animals use scent marking to advertise their territory – they urinate at strategic locations – to communicate their social status and ownership. It has been suggested that markings serves to attract females and potentially warn off competitors. Much like the peacock tail, males' [scent marks](#) appear to be a secondary sexual trait, which females evaluate to judge the quality of a potential mate. When male house mice are subordinate or sick, for example, their scent marks become less conspicuous and less attractive to female mice.

Intrusion causes an increase in scent-marking activity

Scientists had already observed that dominant male mice mark their territory more than subordinate males and that competition with other males increases the marking effort, but surprisingly no study ever tested whether scent marking enhances males' mating or [reproductive success](#). Kerstin Thonhauser and colleagues from the Konrad Lorenz Institute of Ethology of the University of Veterinary Medicine therefore set out to test whether scent marking increases males' reproductive success. They manipulated and quantified males' scent markings on PVC tiles that they placed on the floor of each of the males' compartments before males were introduced into their enclosures. To simulate territorial intrusion, after a few days they exchanged all of the tiles in a male's compartment his neighbour's tiles. The researchers confirmed that males deposited more scent marks when they perceived a competitor in their territory than otherwise and that they took special pains to mark the borders of their territory. Subsequently the scientists let female mice choose to interact and mate with either one, or both of two unrelated males, each in their own territory.

Better markers have more offspring

Their genetic analysis of the females' offspring showed that males that deposited more scent marks had higher reproductive success than other males. "Our study provides the first direct evidence that scent marking is maintained by sexual selection, as it enhanced males' reproductive success when females could choose their mates", explains Dustin Penn, the senior author of the study. Why should this be so? It was not because low markers were non-territorial subordinates, as all the males in the study had their own territories. Another possibility is that females prefer to mate with males that are better markers, because it conveys information about the males' health, condition or quality. Scent-marking is energetically costly and attracts predators, and therefore poor quality males are probably less able to afford higher marking rates. Dr. Penn and his group are currently investigating the biochemistry of mouse urine to determine how scent marks provide information about males' health and condition.

Friends without benefits

Unexpectedly, however, the team found that [female mice](#) were more likely to socialize with the lower rather than the high marking males. So, it seems that mouse females prefer to spend their time with the less flashy males, but they tend to mate with the flashy, more conspicuous males.

More information: Thonhauser, K. et al. Scent marking increases male reproductive success in wild house mice, *Animal Behaviour*.

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