

# Bears that mark more trees may be more successful in mating

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Brown bears that rubbed against more trees at more sites were more likely to have reproductive success, according to a recent study by U of A researchers. Credit: Mark Boyce

Brown bears that are more inclined to grate and rub against trees have more offspring and more mates, according to a University of Alberta study. The results suggest there might be a fitness component to the poorly understood behavior.

"As far as we know, all bears do this dance, rubbing their back up against the trees, stomping the feet and leaving behind odors of who they are, what they are, what position they're in, and possibly whether they are related," said Mark Boyce, an ecologist in the Department of Biological Sciences.

"What we were able to show is that both males and [females](#) have more [offspring](#) if they rub, more surviving offspring if they rub and they have more mates if they rub."

The research team led by Boyce and post-doctoral fellow Andrea Morehouse identified and collected bear hair samples from 899 bear rub spots, which included trees, fence posts and power poles, in the Alberta Rocky Mountains south of Highway 3 for a period of four years starting in 2011.

The team genotyped 213 individual brown bears (118 males, 95 females). Building on the work of Curtis Strobeck, who realized a decade earlier that emerging DNA methods could be used to identify individual bears, the team used previously collected data for more 2,043 individual brown bears in the area to create a family tree.

What the results showed was that bears that rub more frequently and at more sites do better.

For every rub object at which a male bear was detected, the predicted number of mates increased by 1.38 times. As well, for each additional occasion during which a male bear was detected, the predicted number of offspring is multiplied by 1.37.

The researchers also observed the same relationships for female brown bears. Females with more mates were detected at more rub objects and on more occasions than females with fewer mates. For each additional

rub object and occasion during which a female was detected, the predicted number of offspring increased by 1.42 and 1.55 times respectively.

"It seems bears that are in good condition are more vigorous and they rub more, and that could be correlated with [reproductive success](#)," he said.

This study also showed that this rubbing behavior helps females with cubs avoid territories of big males, by often choosing marginal habitat near ranch buildings or closer to roads.

"This is done by scent and the reason they do is that big males are notorious for killing cubs," said Boyce. "Big males won't go anywhere near a building, but for females with cubs, that's an acceptable risk."

He added further studies may also shed light on sexual selection in bears. While brown bears will fight tooth and nail to protect their territories, which will often include the territories of up to four females, females have a say.

In fact, previous research showed upwards of 17 per cent of all brown bear litters are sired by multiple males.

"Female choice is a big deal," said Boyce. "In this study, we proposed an alternative hypothesis that female brown bears use the information obtained from olfactory cues of rubbing males throughout the season to choose offspring paternity."

The study, "The smell of success: Reproductive success related to rub behavior in [brown bears](#)," was published in *PLOS ONE*.

**More information:** Andrea T. Morehouse et al, The smell of success:

Reproductive success related to rub behavior in brown bears, *PLOS ONE* (2021). [DOI: 10.1371/journal.pone.0247964](https://doi.org/10.1371/journal.pone.0247964)

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