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Waye Contributes to Paper Published in Royal Society Proceedings B

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WAYE CONTRIBUTES TO PAPER PUBLISHED IN ROYAL SOCIETY PROCEEDINGS B

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"By combining telomere loss, age, and body condition, this study underscores the difference in life history strategies between male and female red-sided garter snakes in a challenging environment."—Associate Professor of Biology Heather Waye

University of Minnesota, Morris Associate Professor of Biology Heather Waye is part of an international team of scientists led by the [University of Sydney](#) that has confirmed a frenzied approach to the mating season is resulting in males ageing faster and dying earlier and in worse condition than their female counterparts, who prioritise body-maintenance over short-term reproductive success.

In the study population of red-sided garter snakes in North America:

- males undertake energetically expensive mating for 2-4 weeks a year;
- males don't eat and must compete with thousands of other males during the mating season;
- females stay at the orgy site for as little as one day, compared with up to 21 days for males; and
- snakes hibernate underground for eight months in their communal dens and emerge en masse in spring, to form large aggregations where males scramble to locate and mate with females.

The research was published last week in the Royal Society journal *Proceedings B*. [Watch the video teaser](#)

The study measured telomere length, which is a biomarker of ageing, in male and female snakes. The team found that males are unable to maintain good body condition, and age faster than females. This is probably because males spend their energy on mating, instead of protecting against DNA and cellular damage associated with ageing. In contrast, females prioritise body condition

and may be better able to repair cellular damage, leading to longer lives and future opportunities to reproduce.

"By combining telomere loss, age, and body condition, this study underscores the difference in life history strategies between male and female red-sided garter snakes in a challenging environment," says Wayne. "Males 'live fast and die young'—they spend their limited resources on the opportunity to reproduce instead of investing in growth and maintenance. For females, larger body size allows them to produce more offspring, so it's to their advantage to maintain body condition so they can live longer and grow."

Senior author at the University of Sydney Dr [Christopher R Friesen](#), explained that the snakes made good use of the relatively short amount of time to procreate, having only four months a year to breed, feed and have babies.

"Although we believe that all females mate every year, they only stay at the den sites (where mating takes place) for a short period of one- to three days; much less than males, who remain for at least a week and up to 21 days, which seems to result in males ageing faster and dying earlier than females" Dr Friesen said.

"Females reproduce every other year, which depends on their stored fat/energy reserves. Our previous research has shown that females can store sperm for up to 15 months or more before she uses the sperm to fertilise her eggs!"

The paper reported: "The relationship between body condition and age differed strikingly between sexes, with females maintaining their body condition with age, while condition decreased with age in males."

In addition to prioritising self-preservation over sex, the female garter snakes studied in Manitoba, Canada, did not waste energy on looking after their babies postnatally, which is in line with the parenting approach of other snakes.

University of Sydney co-authors at the [School of Life and Environmental Sciences](#) are Dr Friesen, Nicky Rollings and Dr Camilla Whittington (Sydney School of Veterinary Science). Other researchers comprise: Prof Mats Olsson, Goteborgs Universitet; Prof Robert Mason, Oregon State University; Wayne; Assoc Prof Randolph Krohmer, Saint Xavier University and Dr Emily Uhrig, Linköping University.

The paper, "[Age-related sex differences in body condition and telomere dynamics of red-sided garter snakes](#)", was published in Proceedings B on 5 April 2017 at 0:01 GMT / 10:01am Australian Eastern Standard Time (AEST).

[University of Sydney web story including video](#)