Differential lifespan effects due to mating in two strains of *Caenorhabditis elegans*

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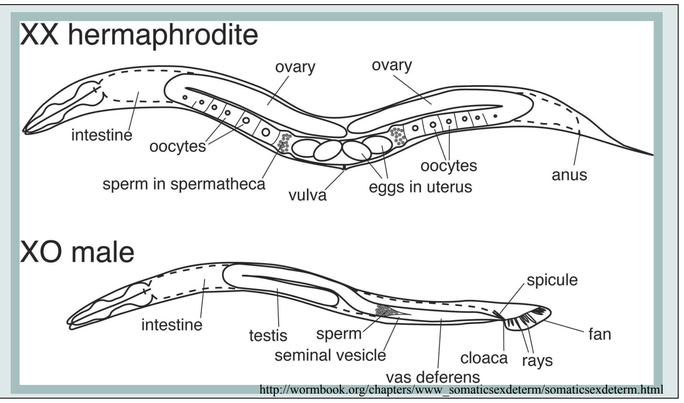
Introduction

- Members of each sex may have different optimal mating strategies. The 'conflict' between what is optimal for each sex is called sexual conflict, which results in negative fitness effects for both sexes[1].
- Responses to sexual conflict depend on the life history of a population[2].
- Previous studies have shown mating causes female and pseudofemale lifespan decreases in individual matings at male-skewed sex ratios in the canonical *C. elegans* strain, N2 [3].

Does lifespan still decrease when mating in larger populations, which reflect more ecologically relevant conditions?
Do sex ratio and strain of worm mediate the effects of sexual conflict on lifespan?

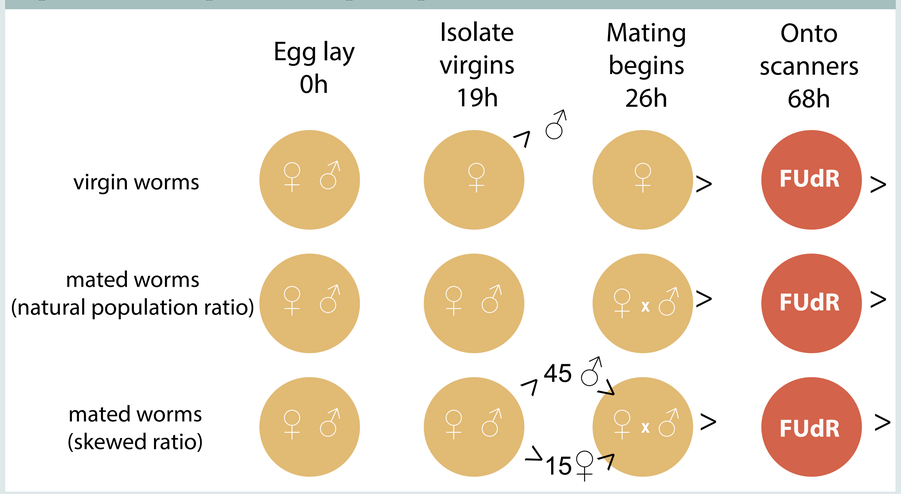
The *C. elegans* model

- Microscopic nematode
- Diversity of mating systems
- Large population sizes, fast generation time
- Pseudofemale worms using gene loss-of-function

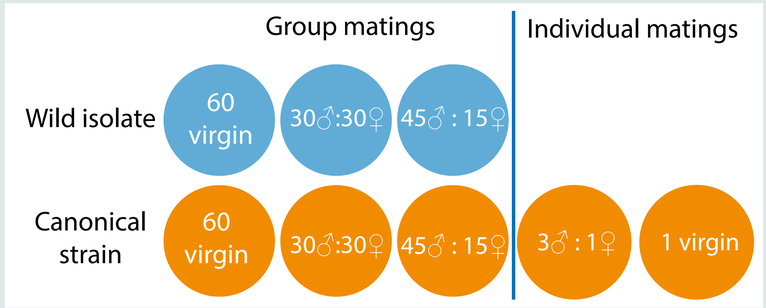


Methods

Experimental setup for all lifespan experiments

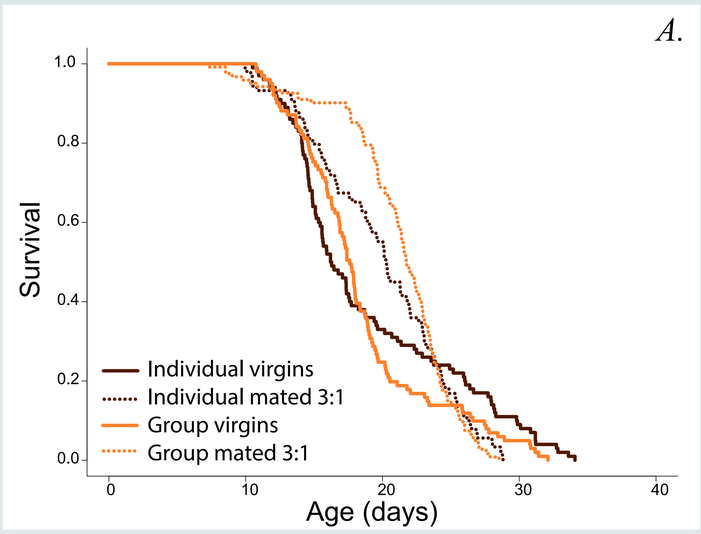


The automated lifespan machine (ALM): office scanners and software for recording lifespan



Population mating ratios

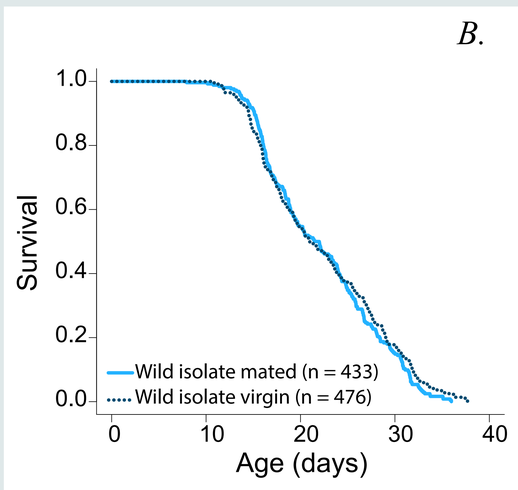
Results

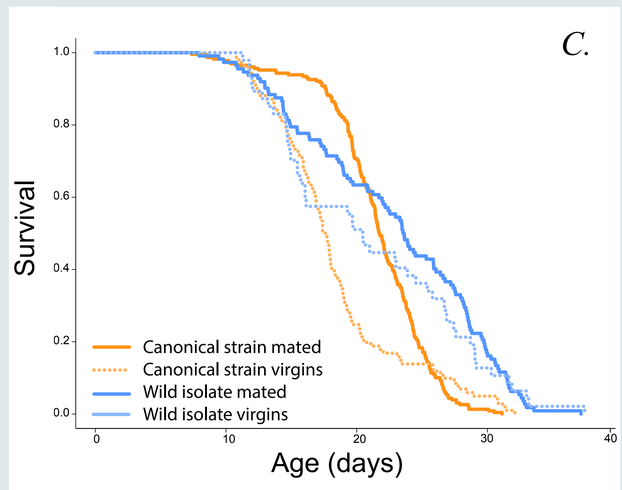


A. Virgin worms have significantly shorter lifespans than mated worms in the canonical strain.

B. There are no significant differences between mated and virgin worms in the wild isolate strain, even at skewed mating ratios.

C. There significant are differences between treatments in canonical and wild isolate strains. The shapes of their lifespan curves appear different.





Discussion

- Responses to mating stress (sexual conflict) differ between strains.
- Provides an alternative narrative to mating-induced demise in female *C. elegans*. Lifespan decreases under the condition of being a virgin in one strain, and does not change in another.
- Automated lifespan technology may reveal the effects of dying within a population.
- Early demise of virgin pseudofemales may reveal a lack of adaptation to a male-female mating system, including the spermless state.
- Importance for studies of sexual conflict, mating behavior, and longevity in *Caenorhabditis.*

Future directions

- Compare lifespans of the hermaphrodite to pseudofemale
- Population effects on ALM such as signalling?
- Experimental evolution with pseudofemales evolved in sperm limited state

References

1. Arnqvist G, Rowe L. *Sexual conflict.* Princeton University Press. 2013.
2. Ting JJ, Woodruff GC, Leung G, Shin N-R, Cutter AD, Haag ES. Intense Sperm-Mediated Sexual Conflict Promotes Reproductive Isolation in Caenorhabditis Nematodes. 2014. PLoS Biol 12(7): e1001915.
3. Shi, C., and Murphy, C. T. 2014. Mating Induces Shrinking and Death in Caenorhabditis Mothers. Science 343(6170):536-40.

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