



When the tap runs dry:

The physiological effects of acute experimental dehydration in the desert adapted mouse

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Peromyscus eremicus

Methods

How are *Peromyscus eremicus* adapted to the desert?

Behavior

Genomic

Why traits vary?

Evolutionary processes that drive variation in a trait

Physiology

How traits vary?

Underlying molecular mechanisms that produces a trait

36 mice (18 males, 18 females)

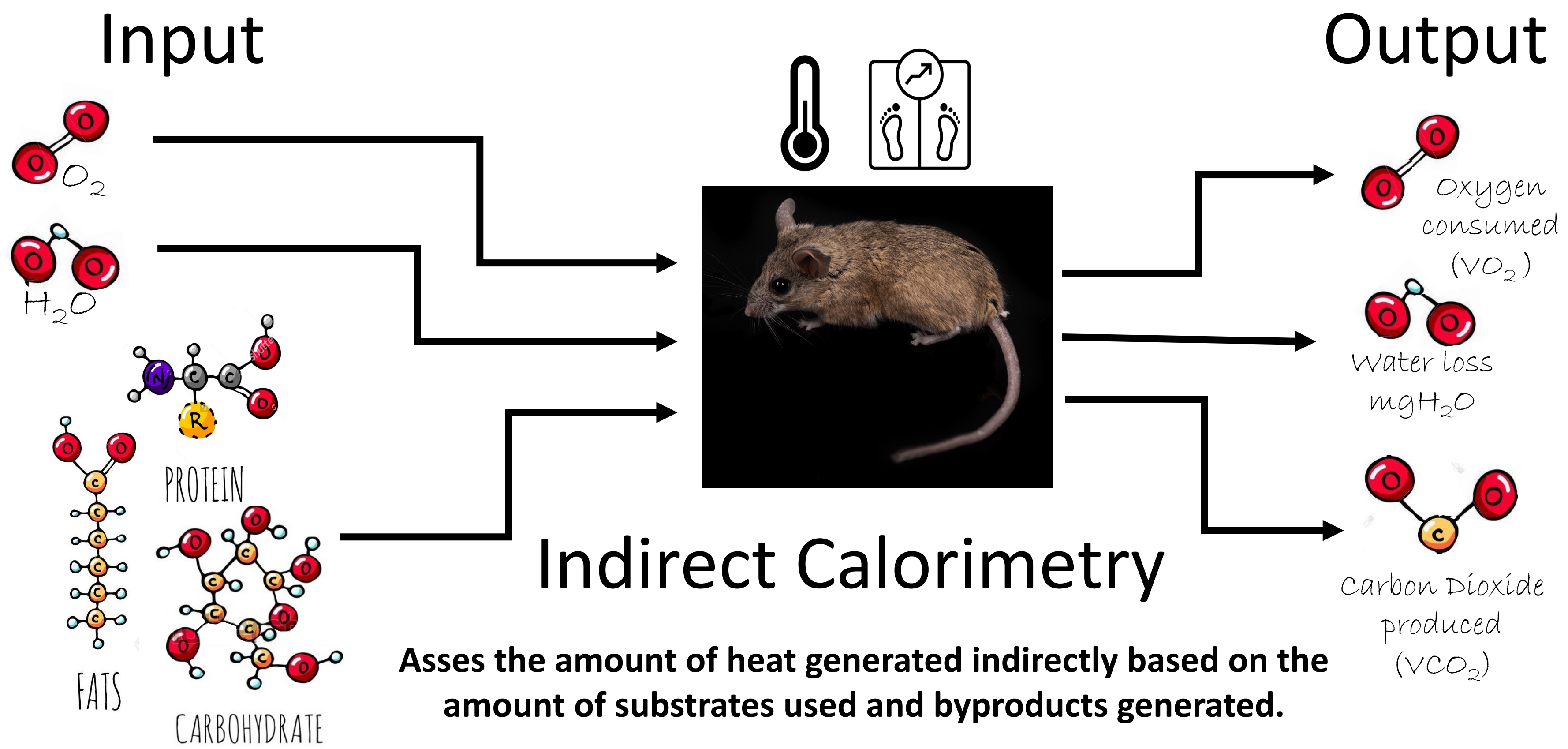
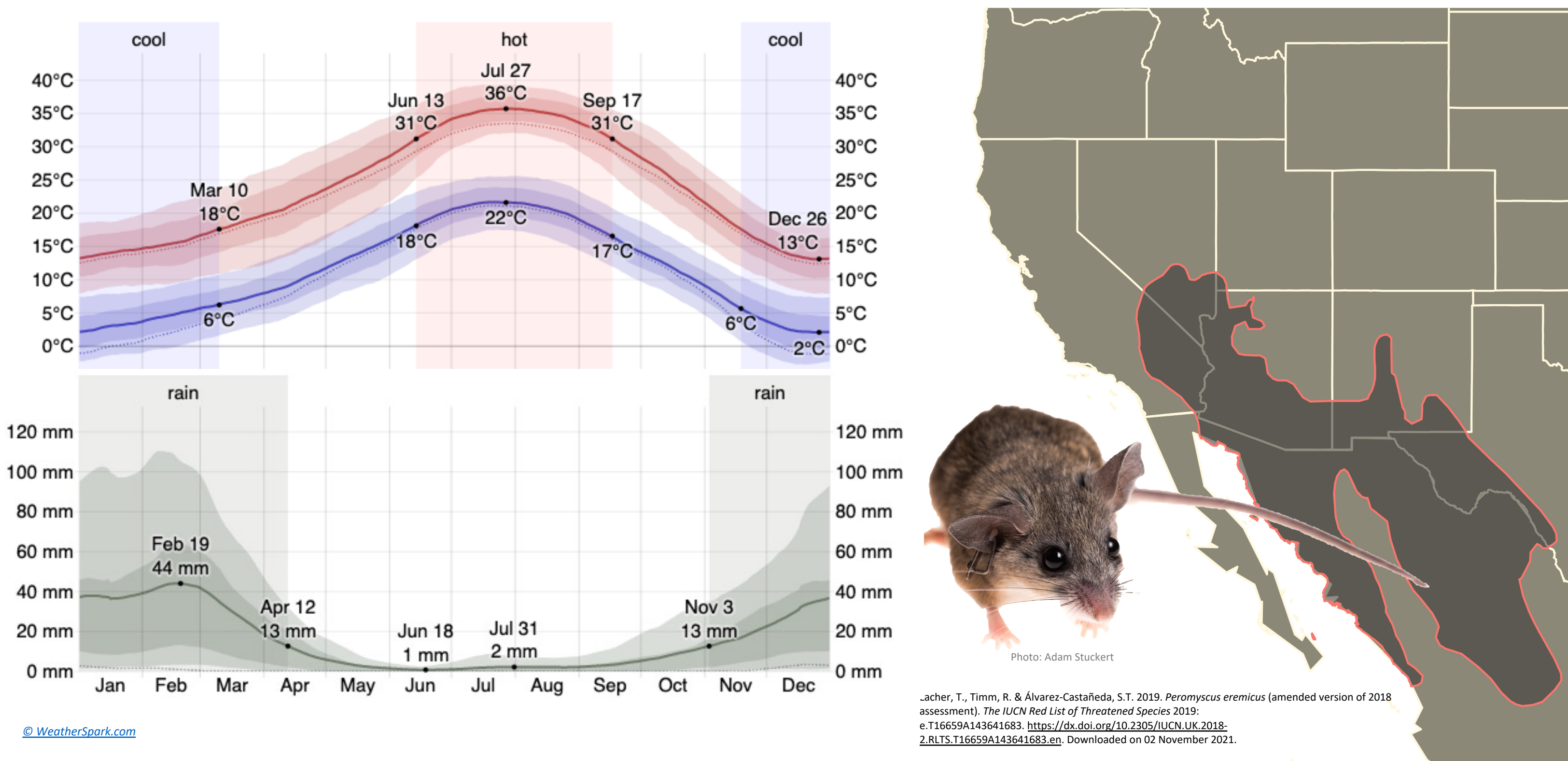
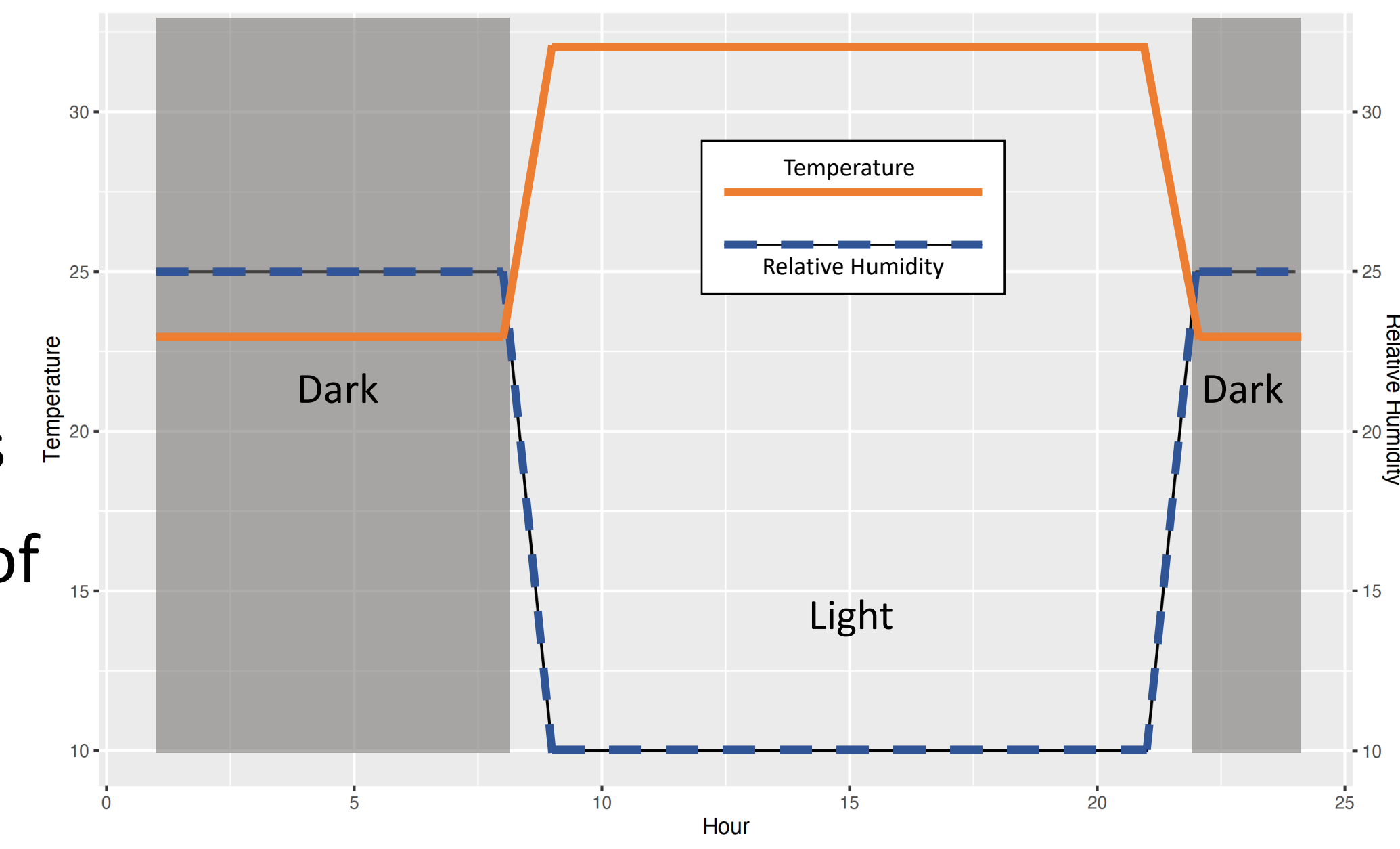
72 hours of data collection in temperature cycling room

Weight every 24 hour

Body temperature every 12 hours

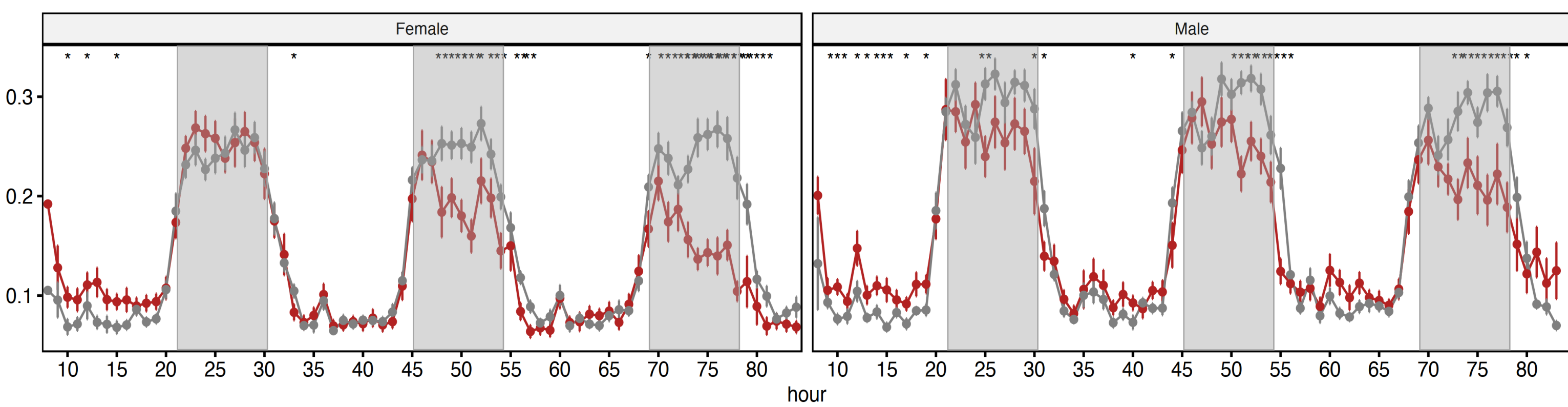
Real time metabolic rate and rate of water loss

Water *ad libitum*
No water



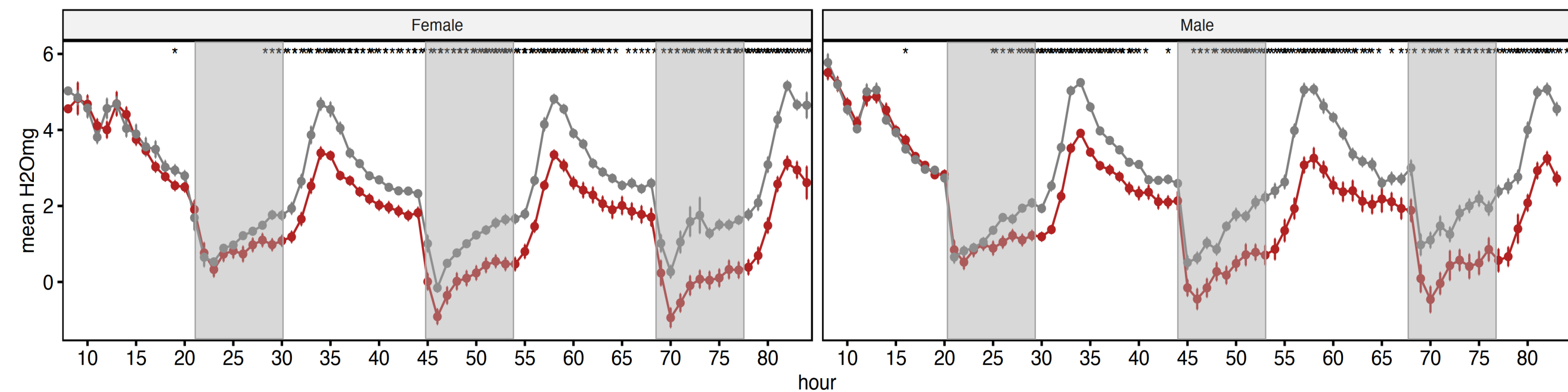
Results

Metabolic rate (kcal hr⁻¹)



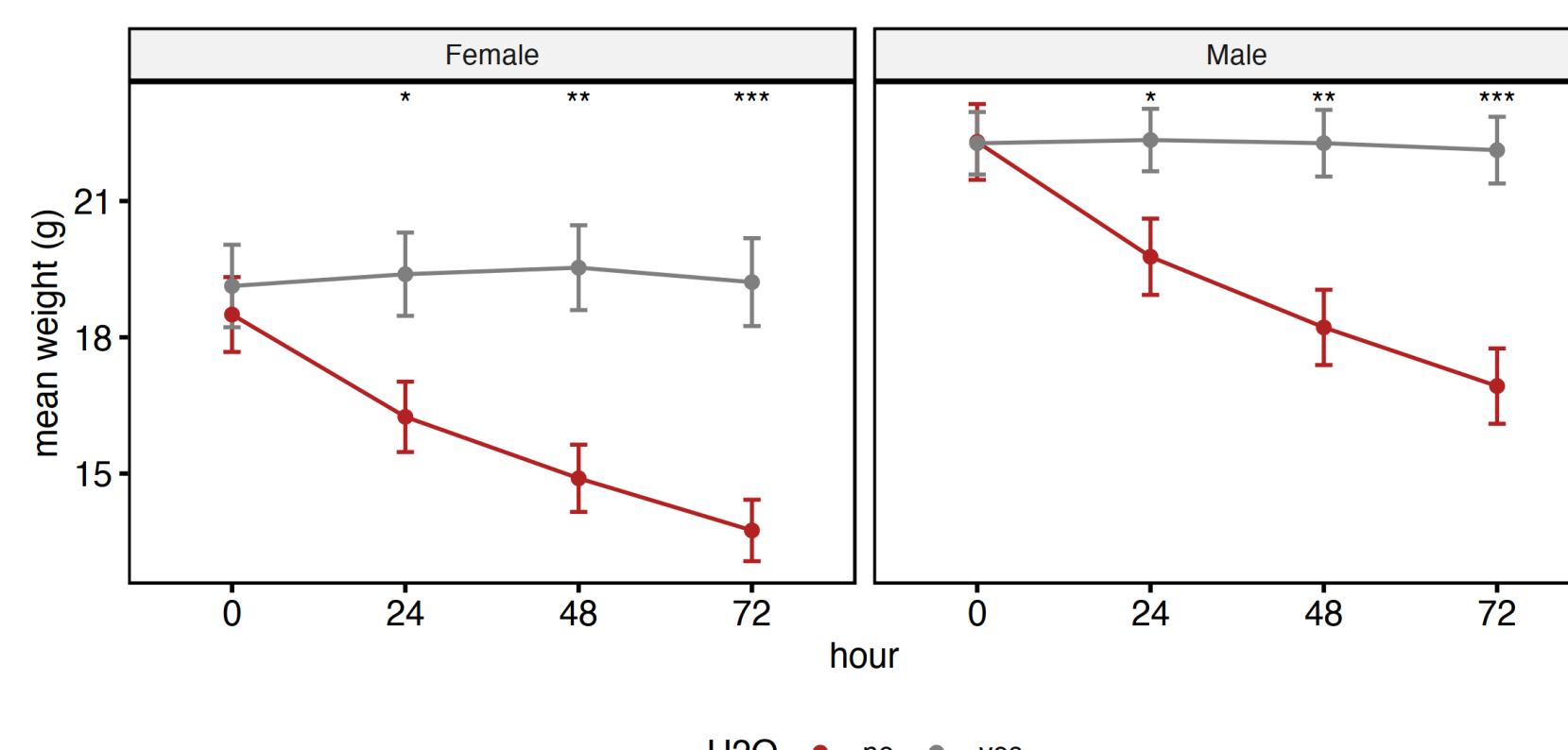
Metabolic rate decreases over the course of three days for mice without water.

Rate of water loss (mg/hr)



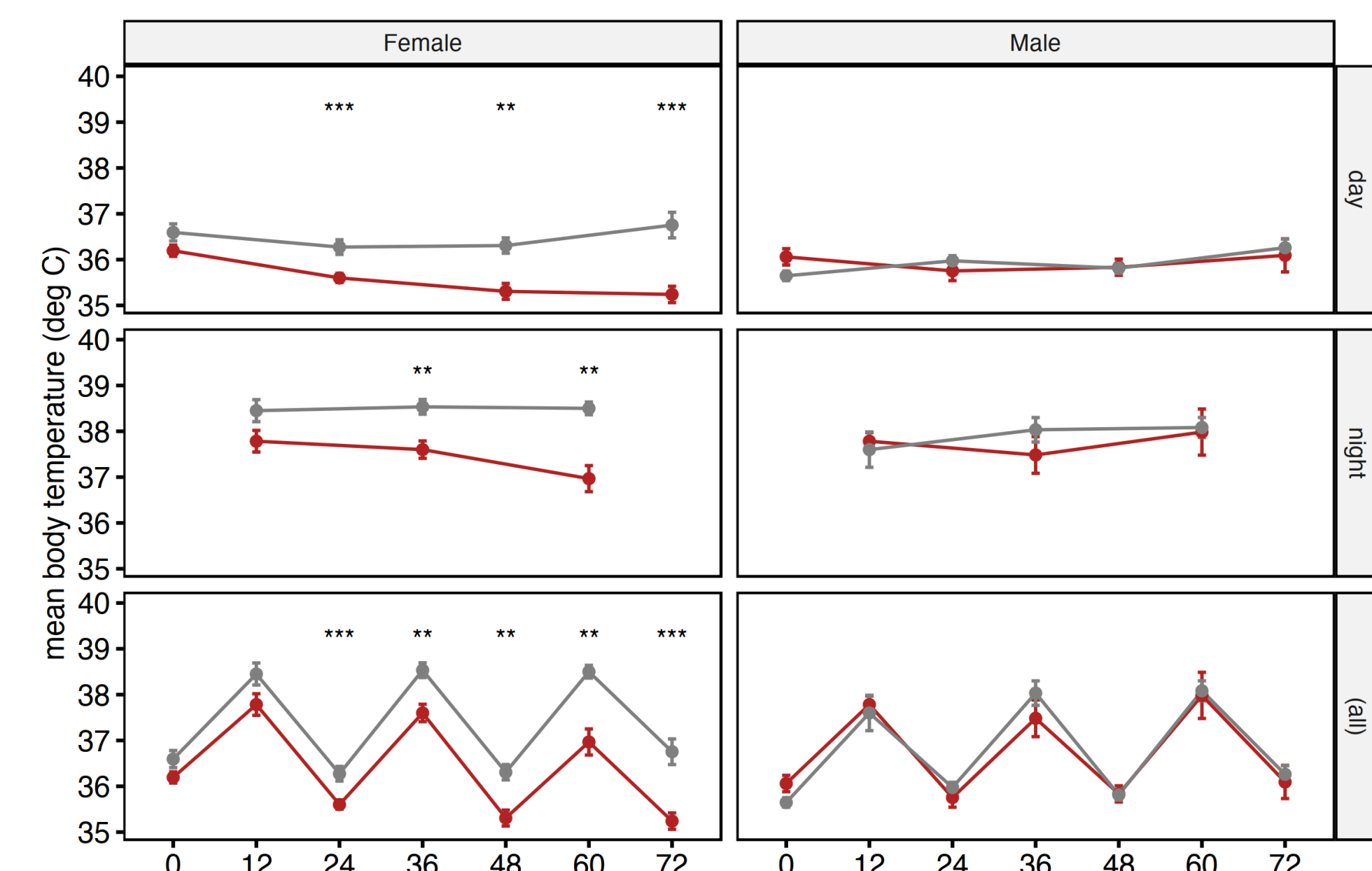
Rate of water loss decreases over the course of three days for mice without water.

Weight (g)



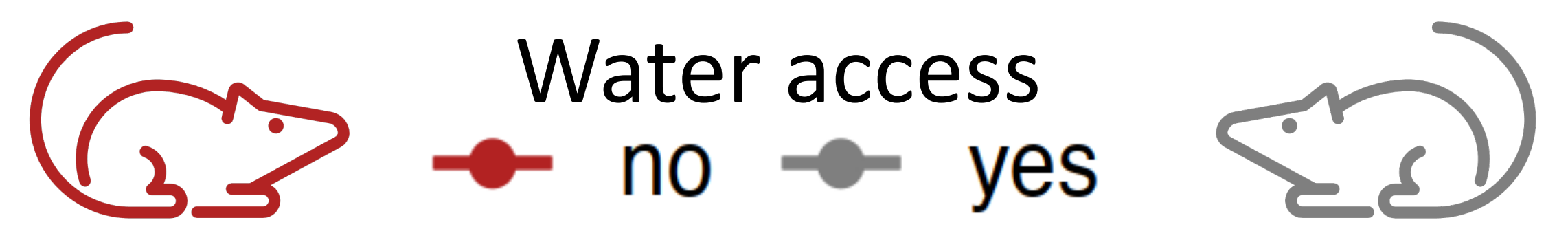
Mice without access to water lose weight over the course of the experiment.

Body temperature (°C)



Body temperature decreases in females that don't have access to water.

Males maintained body temperature for both water treatments.



Discussion

Metabolic rate

Metabolic rate decreased during the dark phases. A lower metabolic rate without water leads to less heat production.

Rate of water loss

Rate of water loss decreases. Water could be decreasing because there is no water to be lost. Reduced metabolism would lead to reduced water lost through respiration. Mice are not using evaporative water to dissipate heat.

Weight loss

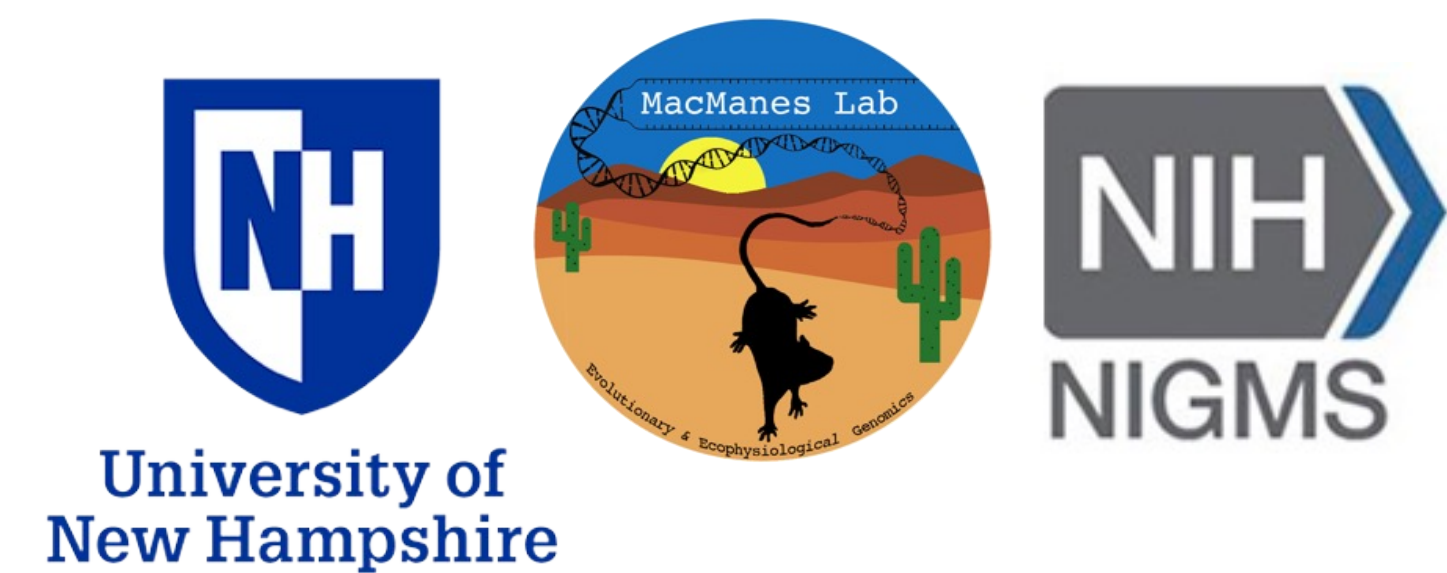
Body weight decreases. Mice are experiencing dehydration-related weight loss.

Body temperature

♀ : Daily torpor increases fitness as reproduction is primarily limited by access to resources.
♂ : Maintained body temperature increases fitness as reproduction is competition based.



Photo: Adam Stuckert



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- P. eremicus* for having cool adaptations