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Swimming beneath the Sahara: The Thermal Biology of *Scincus scincus*, the Sand-swimming Skink

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Swimming beneath the Sahara: The thermal biology of *Scincus scincus*, the sand-swimming skink

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Learn more about the Gangloff Lab of Amphibian & Reptile Ecophysiology at OWU:



Background

- Sandfish skinks are desert specialists from the Sahara and Arabian Peninsula
- Little to nothing is known about their natural history, including thermal biology

Driving Questions

- (1) How do sandfish skinks use their microhabitat of sand horizons to thermoregulate?
- (2) How temperature-dependent are certain activities?

Hypotheses

- Sandfish skinks will actively **thermoregulate** in the sand horizons
- **Diving ability** will be minimally temperature-dependent because it is a short burst activity and there will be strong selection for predator avoidance
- **Sprint speed** will be highly temperature-dependent because it requires sustained physiological output

Methods

Preferred Temperature (N = 8)

- Sandfish skinks **thermoregulate** in gradient from 20-45°C for 7 days
- Body temperatures logged every 10 minutes

Diving performance (N = 8)

- Sandfish skinks dive below the sand to **escape predators**
- Recorded sand diving three times in slow motion across a range of temperatures

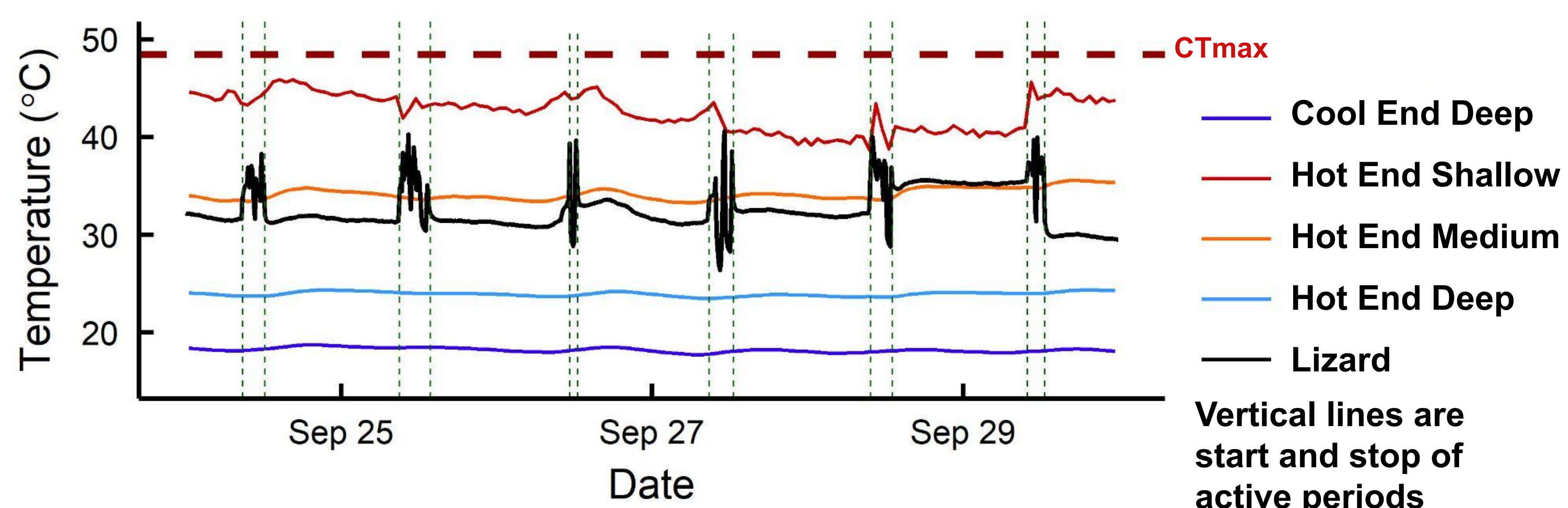
Sprinting Performance (N = 8)

- Sandfish skinks are **visual hunters** and once prey is located they sprint after it
- Ran three times at each temperature, with fastest 50-cm sprint used to determine performance

Critical Thermal Maximum (N = 5)

- Upper temperature when unable to complete righting response

Example of thermal preference trial over one week



Preferred Temperature Results

- Sandfish skinks are matutinal and active for an average of **4 hours** in the morning
- Active T_{pref} mean \pm SE: **34.6 \pm 0.8°C**
- Inactive T_{pref} mean \pm SE: **31.2 \pm 1.7°C**

Critical Thermal Maximum Results

- CT_{max} mean \pm SE: **48.4 \pm 0.2°C**

Conclusions

- Sandfish skinks **thermoregulated to different temperatures** during active and inactive periods
- **Diving** speed showed significant **temperature dependence**
- **Sprinting** speed showed a reliance on body temperature, but to a **lesser extent** than that of diving
- Little among-individual variation in diving performance suggests **strong selection** for faster **dive times** for predator avoidance

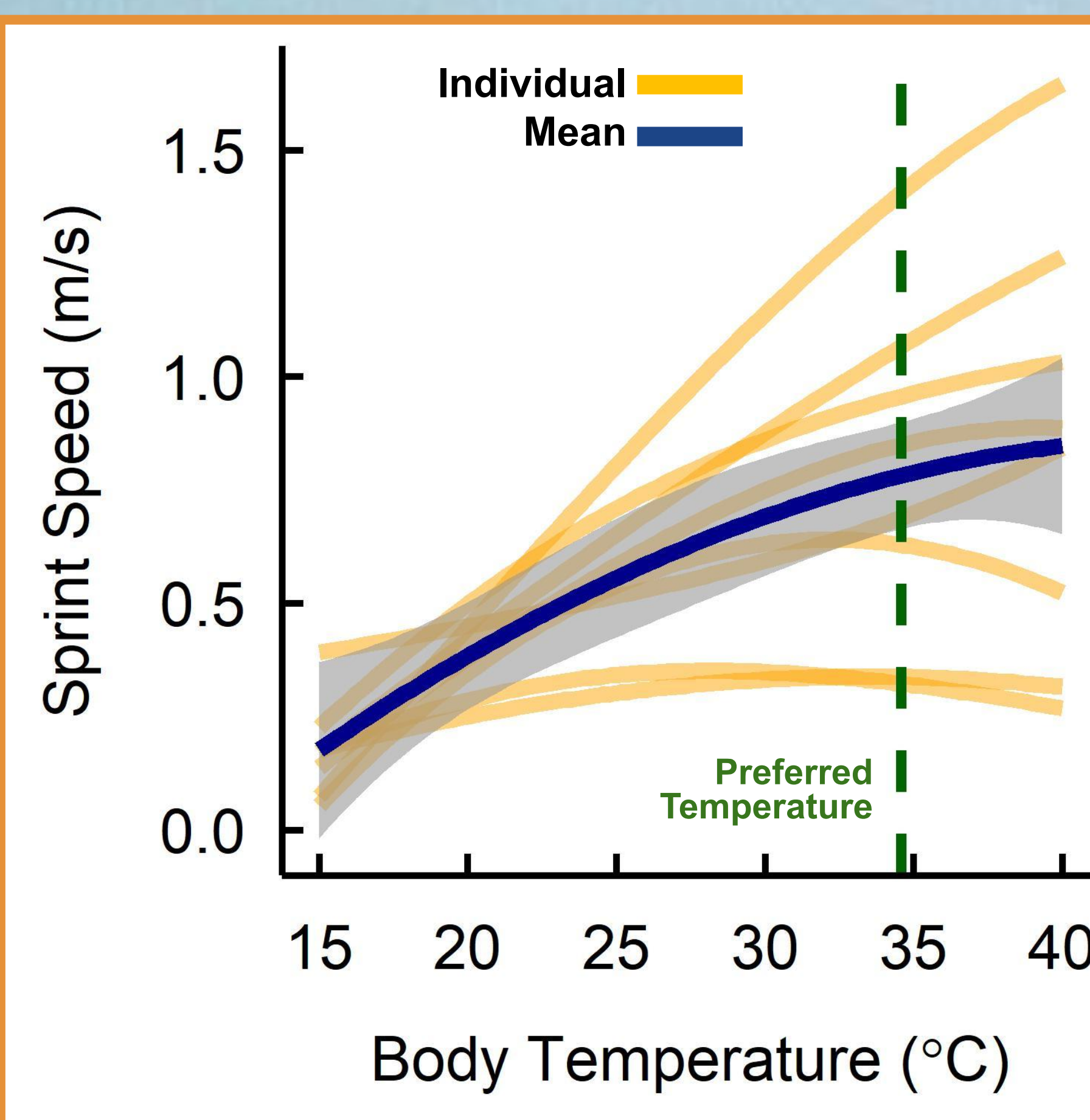
Next Steps

- Quantify how other behaviors and activities are affected by temperature
 - Bite force
 - Resting and active metabolism
- Look into other aspects of *Scincus scincus* natural history
- Compare traits among closely related species



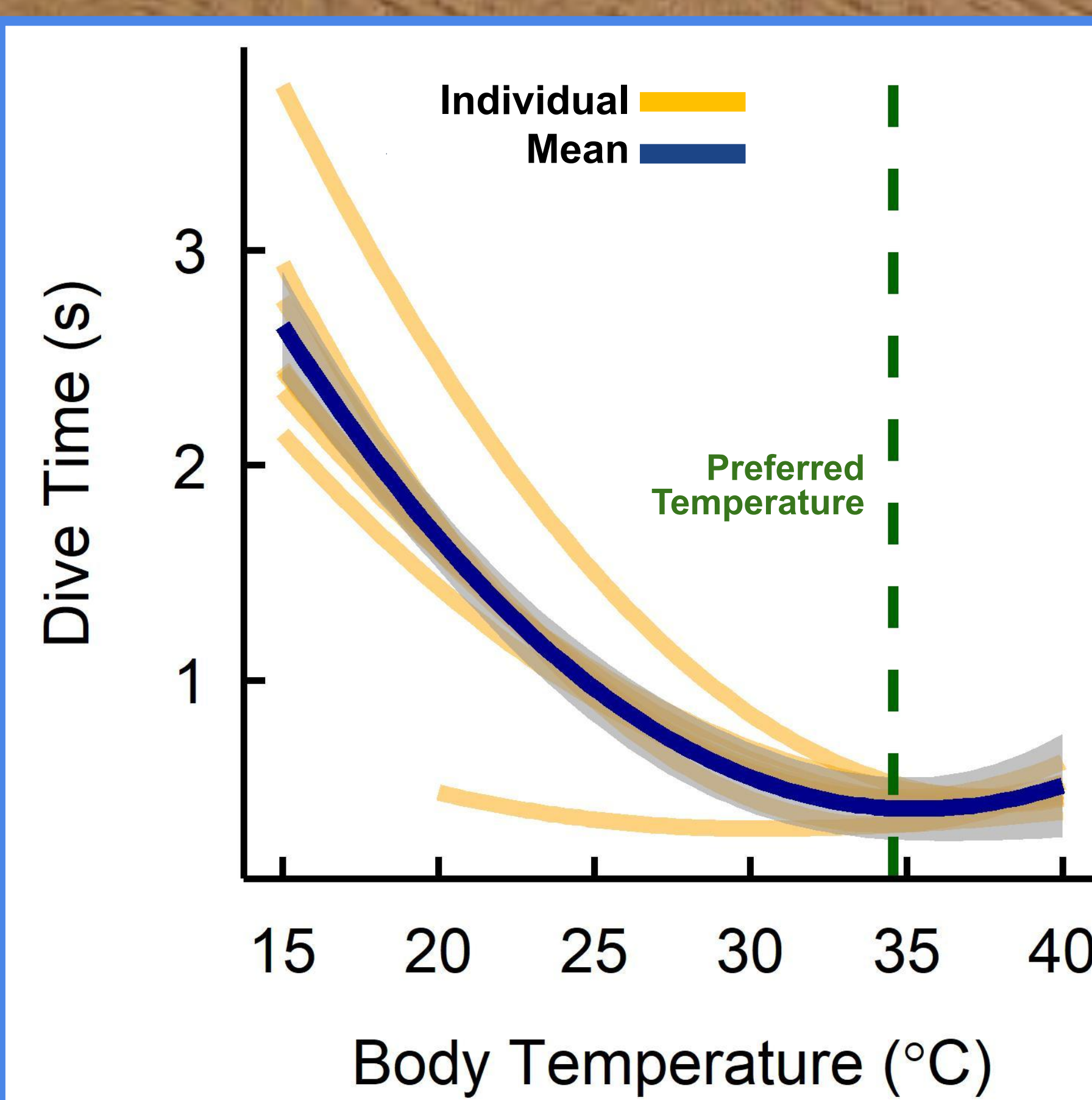
Example Dive Trial

Fastest elapsed time for complete dive: **409 milliseconds**



Sprinting Results

- As body temperature increases, sprint speed increases
- As temperature increases, among-individual variation greatly increases



Diving Results

- As body temperature increases, dive speed increases
- Little variation among individuals

This work would not have been possible without the help of hobby Sandfish skink keepers in Japan, especially @Zo__no on twitter