

Differences in salt chemotaxis in *Caenorhabditis* species and sexes

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Introduction

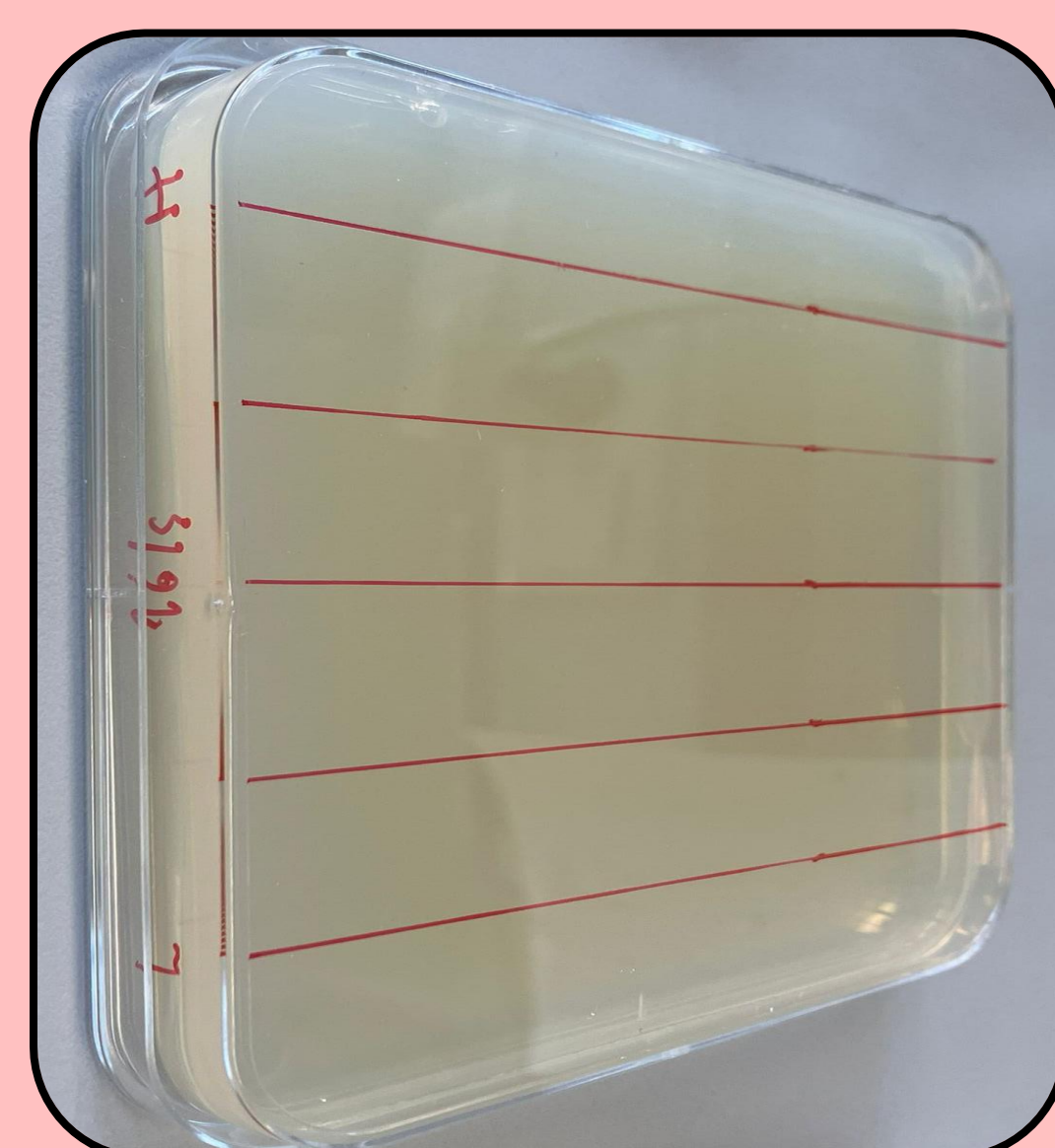
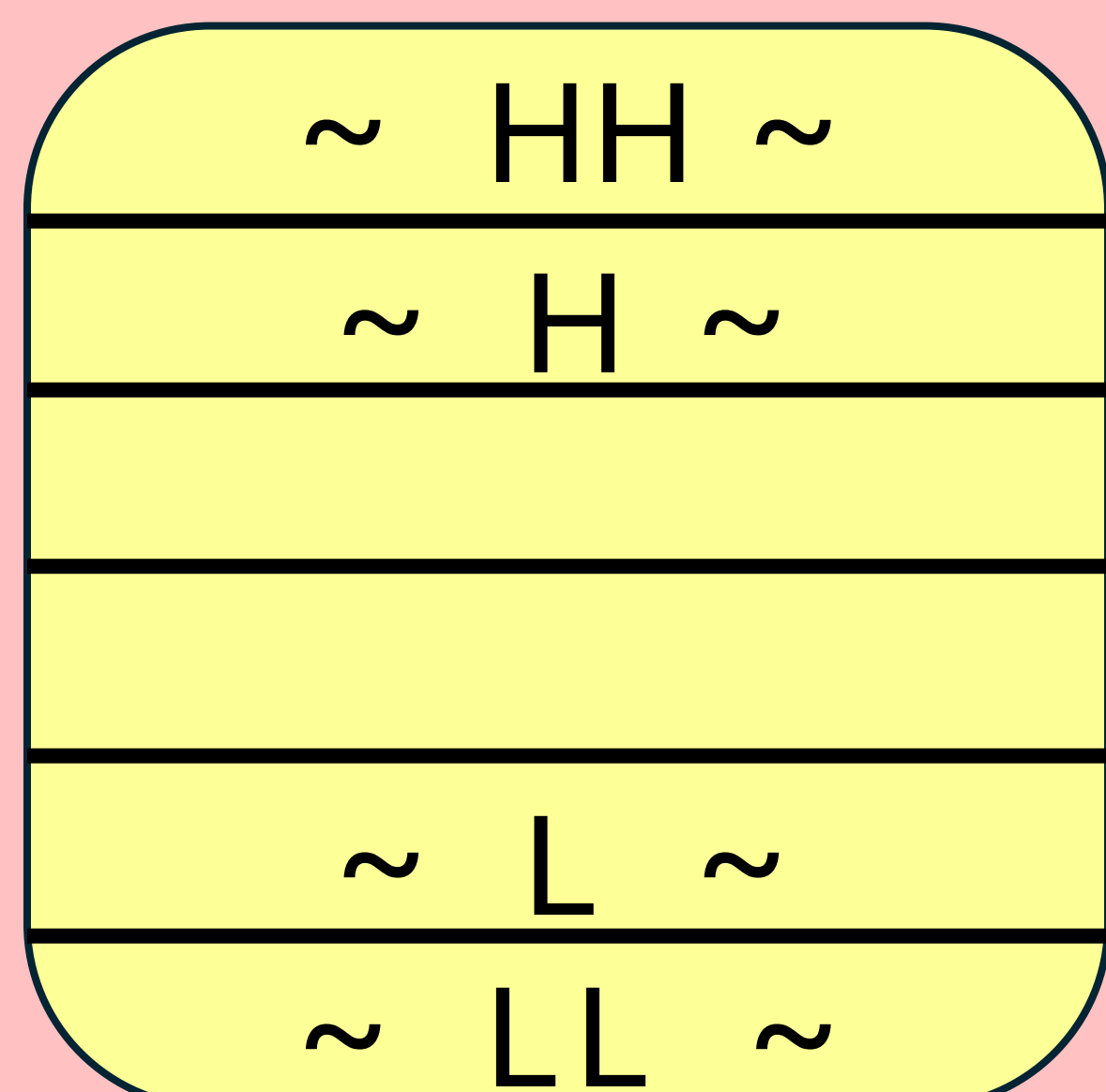
- ~ *C. elegans* is an important model organism, with mostly hermaphrodites in the wild.
- ~ Closely related species, *C. remanei* and *C. brenneri*, are gonochoristic and inhabit distinct geographic areas.
- ~ **Caenorhabditis nematodes associate salt concentration with food conditions, adjusting their movement accordingly.**

Our expectations:

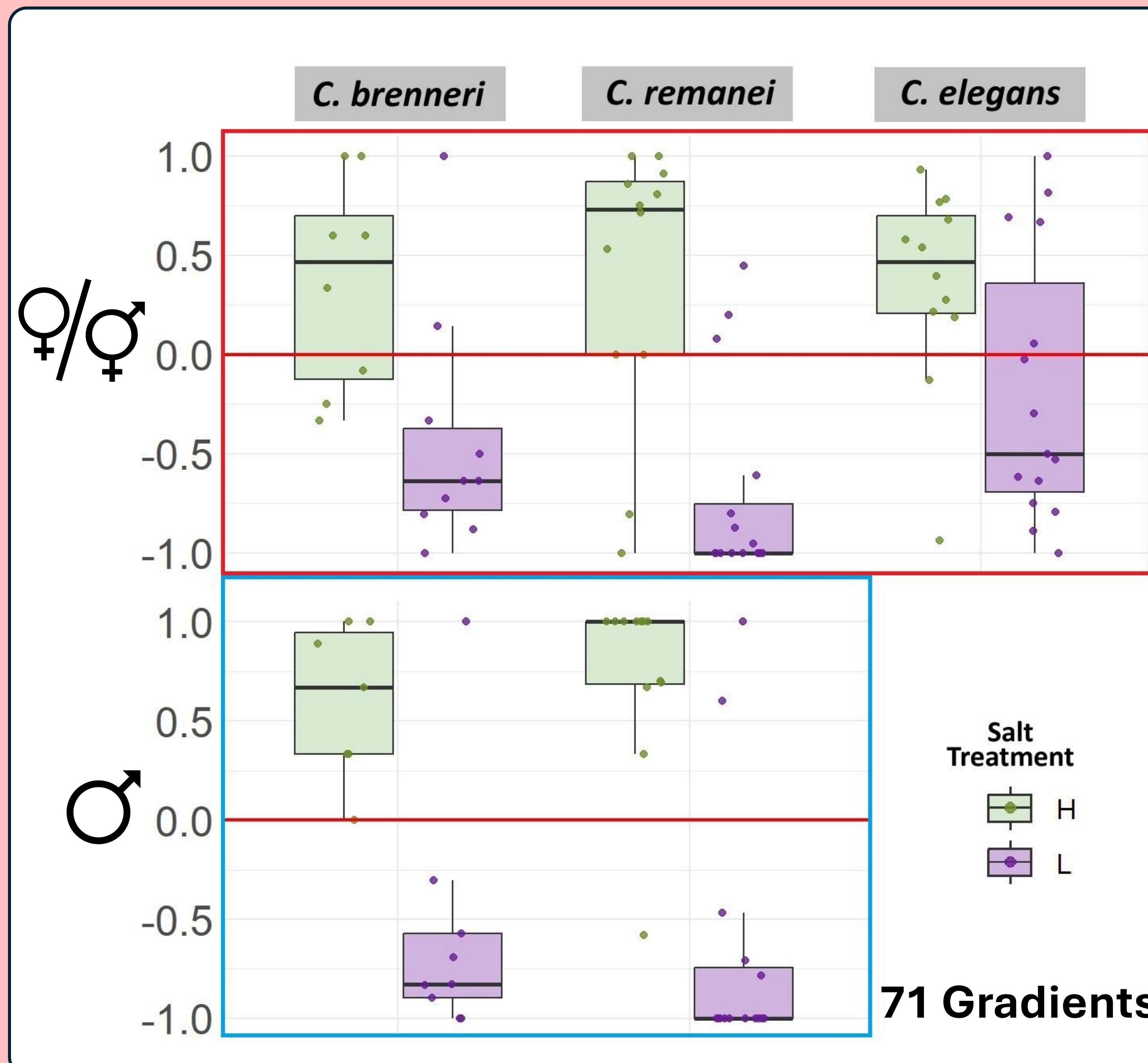
- We had **no** expectation for differences between species.
- We expected males to move **more**.

Material and Methods

- ~ Worms were synchronized to standardize age.
- ~ They were raised, well fed, on high and low salt.
- ~ We measured worm preference according to plate position on a salt gradient.
- **Chemotaxis index:** representative location on gradient, analyzed by **linear regression**.
- **Proportion of worms** on every plate zone. **Ordinal logistic regression**.



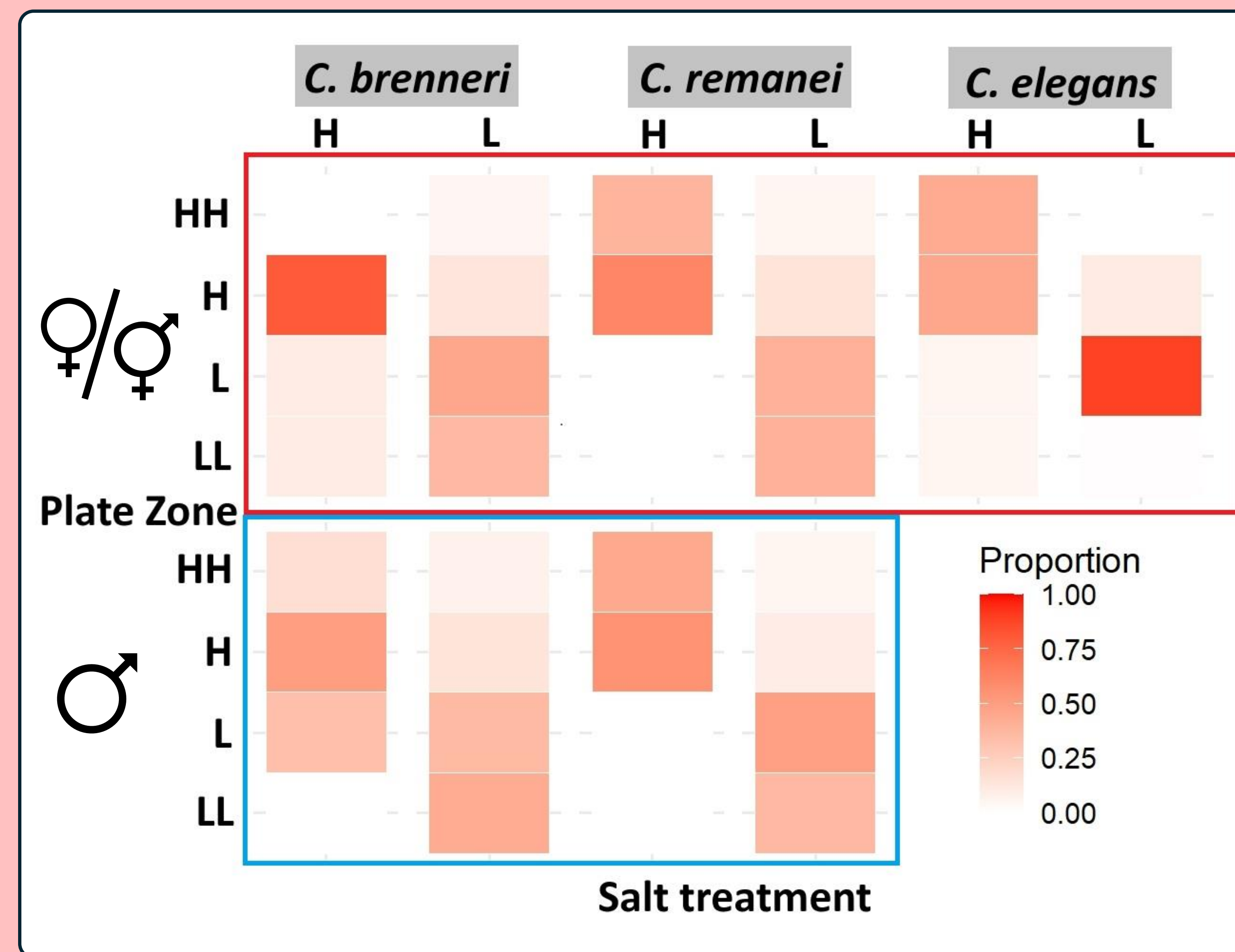
Linear model results



71 Gradients

- ~ **Significant interaction** between sex and salt treatment. Male index changes **more** between treatments than female/hermaphrodite index.
- ~ **No significant effect** of species.

Ordinal logistic model results



- ~ In a model without *C. elegans*, we found a **significant three-way-interaction** between sex, species and salt treatment. *C. remanei* males show the strongest response.
- ~ In a model that combined sex and species as one factor, we found *C. remanei* males' behavior changes most, followed by *C. brenneri* males. *C. remanei* females respond the least.

Conclusions

The interactions between sex, species and salt treatment best explained worm movement.
***C. remanei* males have the most plastic behavior, closely followed by *C. brenneri* males. *C. remanei* females have the least plastic response.**

- More subtle differences in behavior are best captured by using:
- ~ A graded response across multiple zones.
 - ~ An ordinal logistic model.

Follow-up

- ~ Within species variation: the effect of strain.
- ~ The variability in response within each group.
- ~ More salt treatments than high and low.
- ~ Using crosses between strains and species.

Food for thought: If behavior is this variable between sexes and species, should we rely on just *C. elegans* as a model?