

Rolling with Pollies: Soil Moisture effect on Recovery from Conglobation in the Common Pill Bug, *Armadillidium vulgare*

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Introduction

Why do pill bugs roll into a ball (or conglobate)?

- ❖ Defense from predators
- ❖ **Water Conservation**
- ❖ Thermoregulation

Hypothesis and Objectives

- ❖ I hypothesized that **soil moisture affects the amount of time it takes for pill bugs to recover from their rolled-up state.**
- ❖ If soil moisture affects conglobation, then pill bugs will spend more time conglobated in a drier environments.
- ❖ No predictions for effect of length or sex.

Methods

Study Area and Collection

- ❖ Pill bugs were collected from my residence
- ❖ Pill bugs were identified by their ability to conglobate, and lack of posterior appendages distinct of *Porcellio scaber* (see Fig. 1).
- ❖ Sexed and measured to the nearest millimeter.

Soil Moisture Trials

- ❖ 24-hour acclimation period
- ❖ Stimulated into conglobation with a puff of air to their ventral side.
- ❖ **Each pill bug was timed in 5%, 15%, 30%, and 40% soil moisture.**
- ❖ Kept separated until trials were completed with 30 min intervals between trials to prevent habituation.

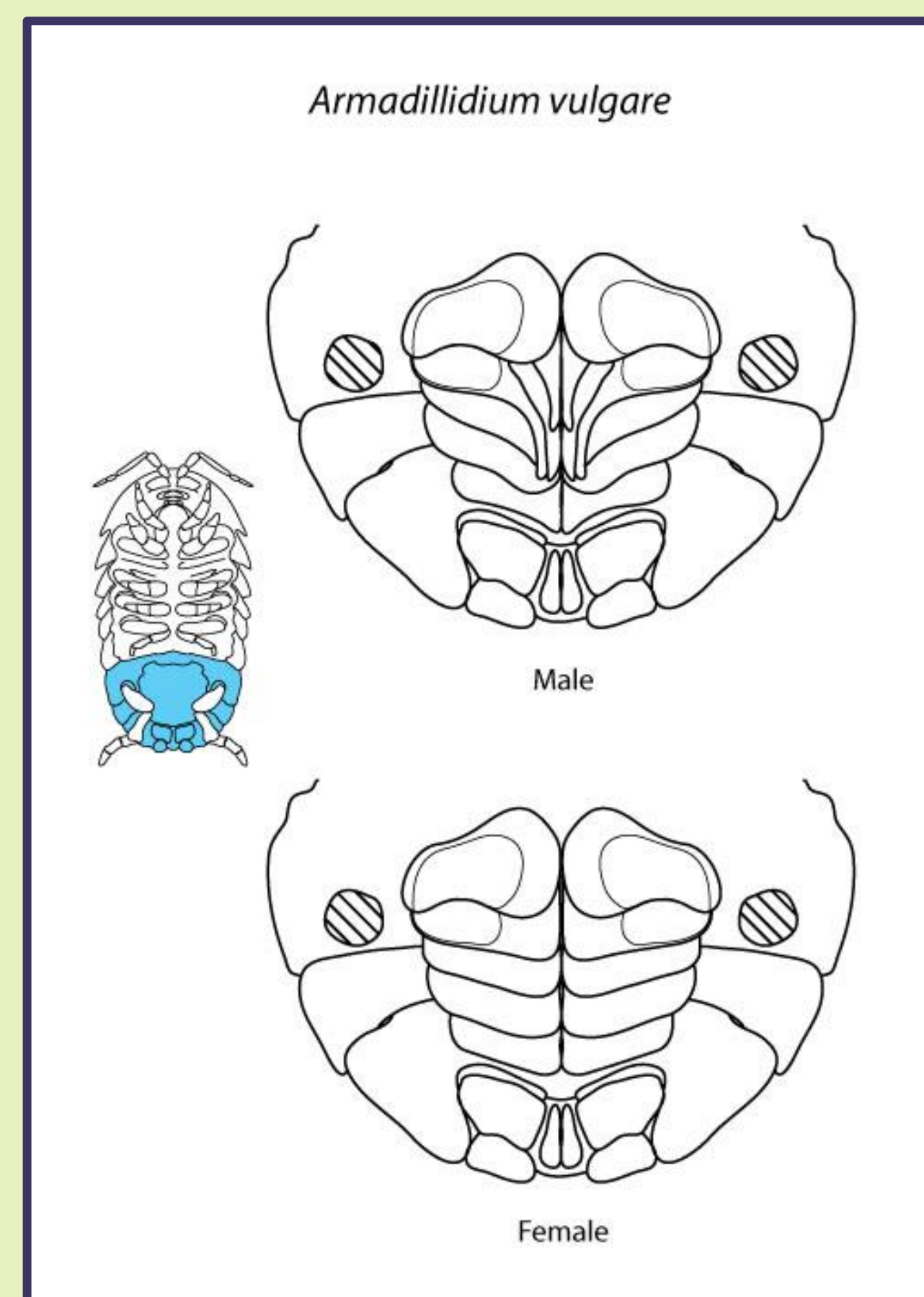


Fig 2. Visual representation of how to sex pill bugs based on ventral surface of pleon. Credit to Sans Vertigo.



Fig 1. Comparison of *Armadillidium vulgare* and *Porcellio scaber*. Credited to University of Nebraska-Lincoln.

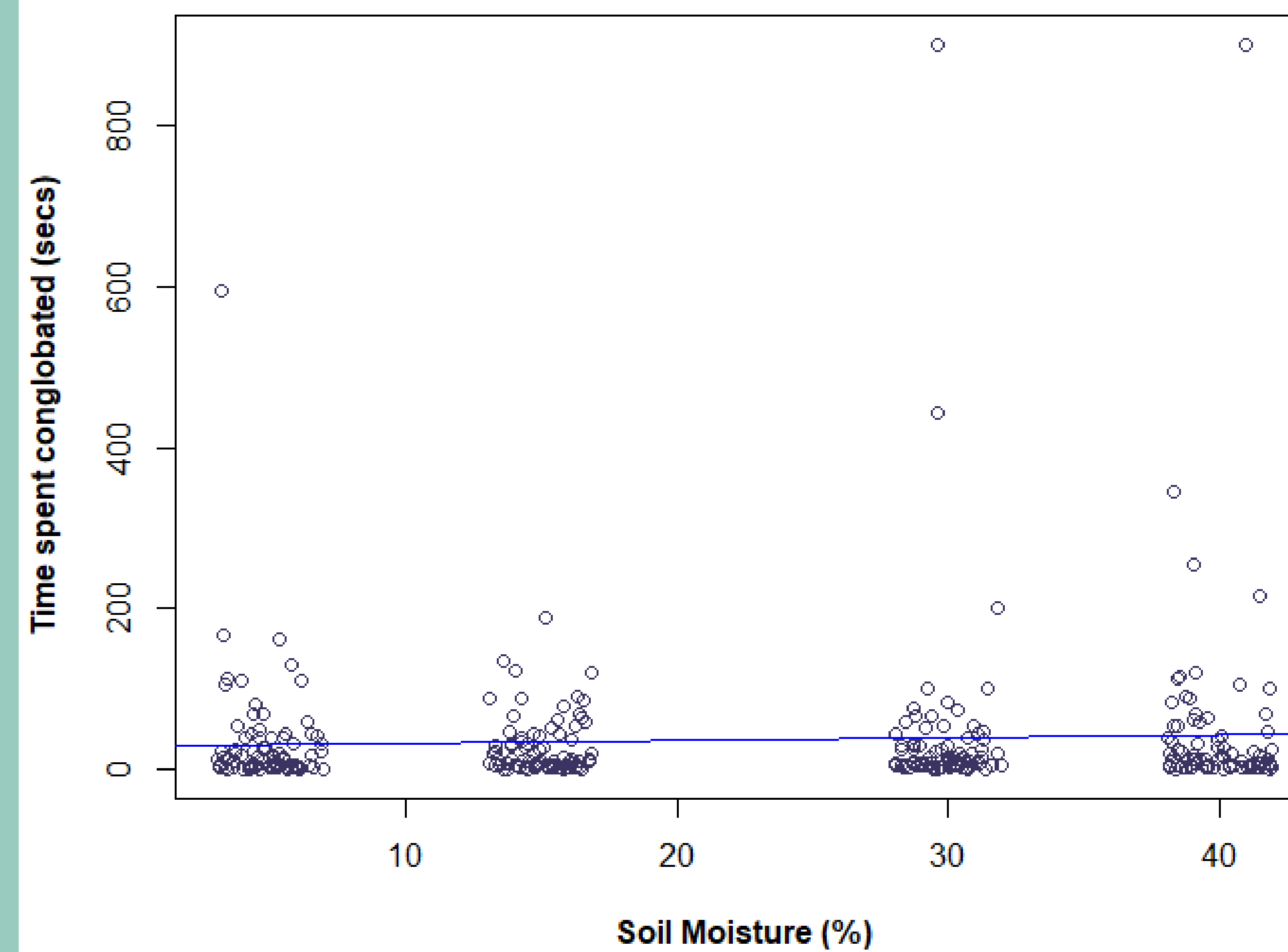


Fig 3. Time spent conglobated (secs) of common pill bugs (n = 82) in differing soil moistures (%) in Humboldt County, CA, 2023.

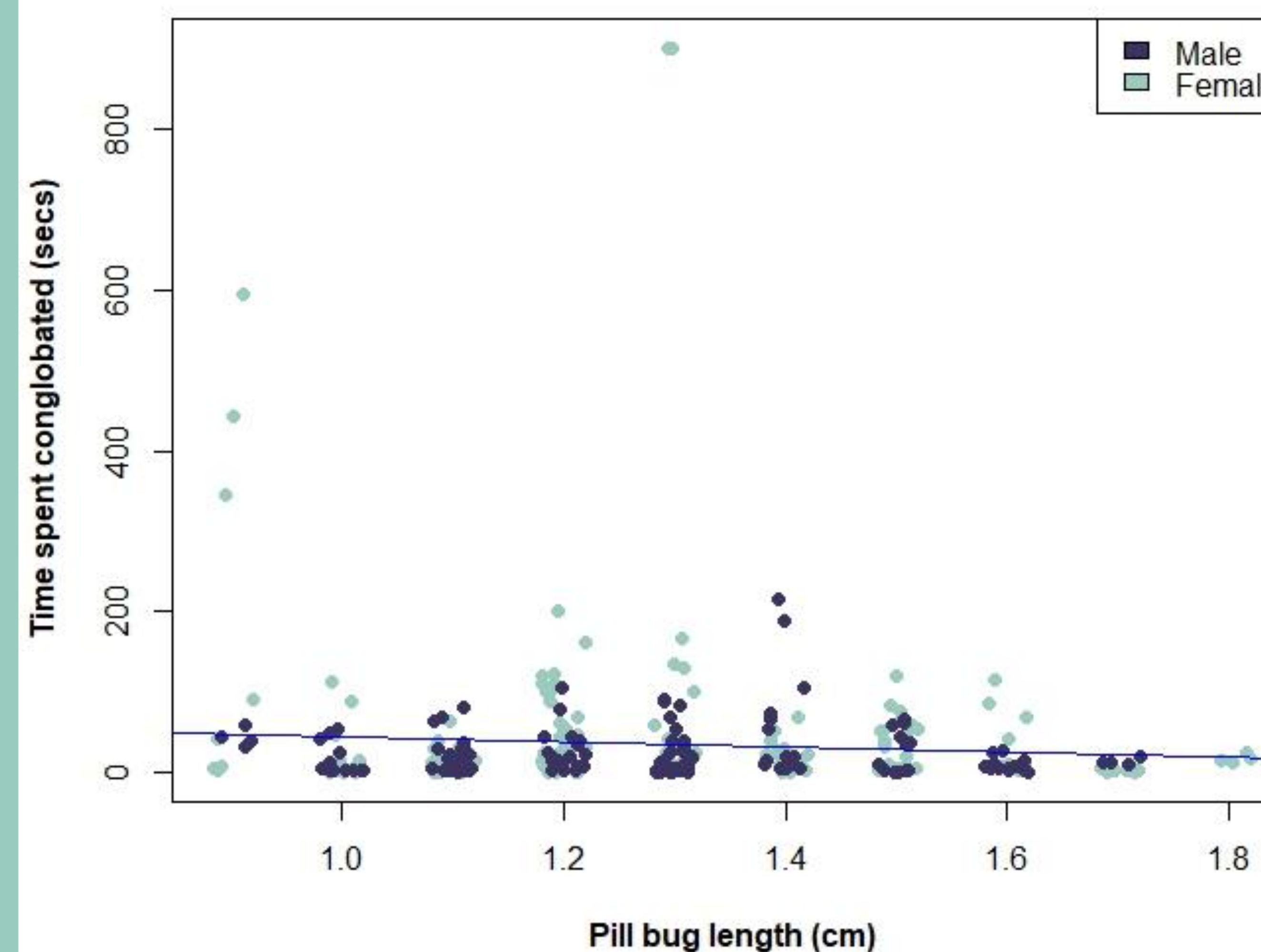


Fig 4. Time spent conglobated (secs) of common pill bugs (n = 82) compared to pill bug length (cm) in Humboldt County, CA, 2023.

Results

Summary of Data:

- ❖ 82 individuals collected, 37 males, and 45 females ranging from 0.7 cm to 1.8 cm in length. 325 trials were conducted.

- ❖ **No statistically significant results.**

Time spent conglobated as a function of soil moisture (Fig. 3).

- ❖ **p = 0.2826**, f = 1.158, df = 328

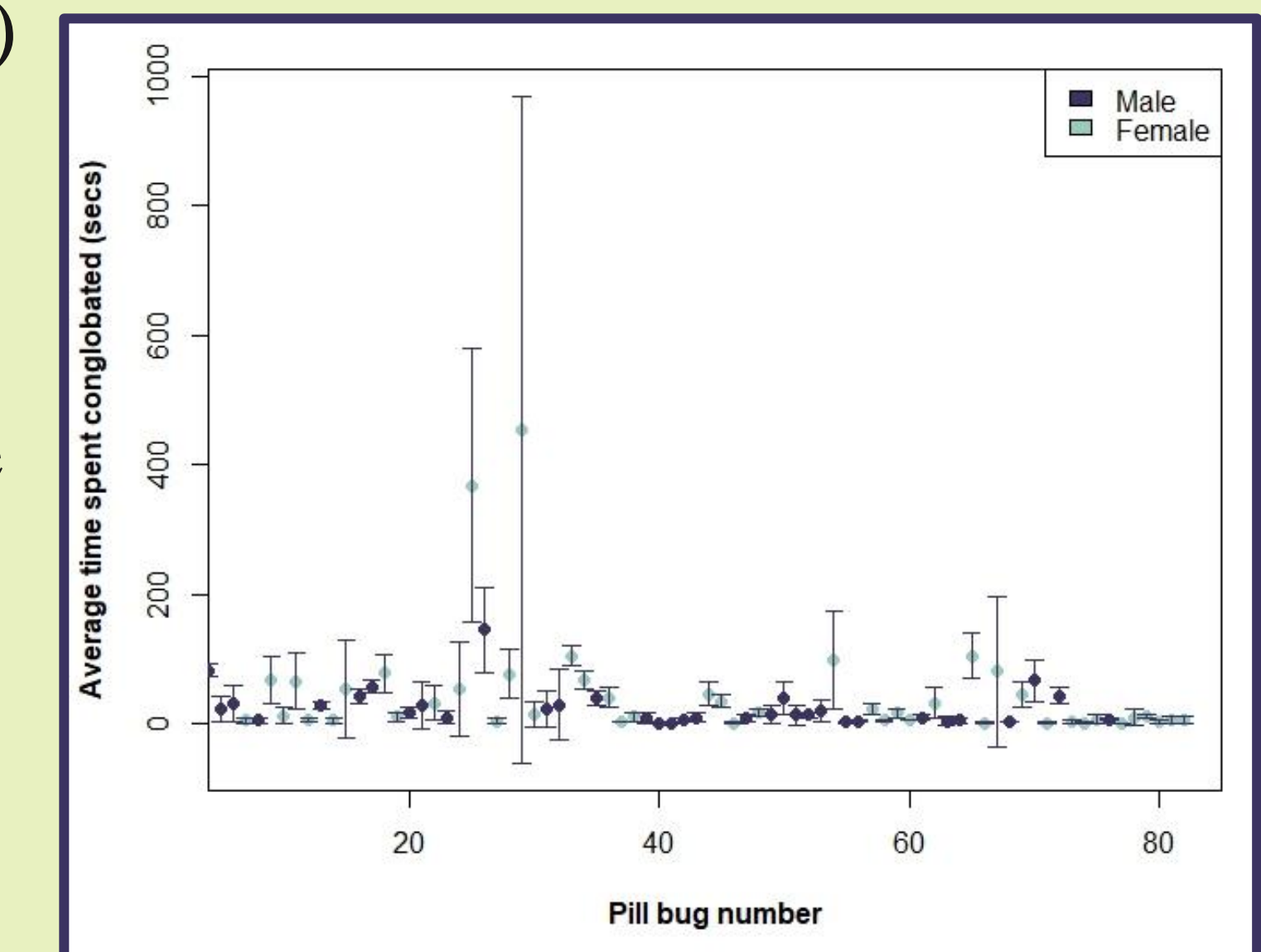
Time spent conglobated as a function of pill bug length (Fig. 4).

- ❖ **p = 0.1635**, f = 1.95, df = 325.

- ❖ Neither males nor females tended to be larger.

Discussion

- ❖ Soil moisture is not correlated with recovery from conglobation, but there was a **great variation among individuals with times from 15 minutes to half a second** (Fig. 5).
- ❖ Horvath et al. (2019) showed evidence that conglobation time can be used as an effective measure of individual “boldness” which could account for the variation.



Other Possible

Confounding Variables:

- ❖ Disease (such as *Wolbachia*)
- ❖ Previous state dependence
- ❖ Humidity

Fig 5. Mean time spent conglobated (secs) of common pill bugs across 82 individuals. Values are means ± standard error, each point representing 4 trials.

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