Meeting Minutes

1. Who was present at the meeting

Client(s): Bradford (Brad) Hull ([hull@arizona.edu](mailto:hull@arizona.edu)）

Consultants:

Taryn Laird ([tarynl@arizona.edu](mailto:tarynl@arizona.edu)) Team lead

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1. When: *September 12th, 2024*
2. Summary of Problem

* Bradford is the 5th year PhD. He has two sets of lifespan data and he want to know if they are statistically different.
* Worms sampled from a population of the same eggs are partitioned into different media; a liquid culture and Agar culture (experimental units).
* Agar experimental units are divided into self-contained plates. There are three replicates of each plate treatment (stressor): control, copper and DTT (dithiothreitol). The dead worms were counted every other day until there were no more worms alive.
* The liquid sample contains approximately 5K worms in a reservoir per treatment. At each time step, approximately 150mL is sampled from the reservoir and ratio of alive/dead are recorded by population drawn. Three replicates are recorded.

1. Discussion

**Bradford:**

* Worms were tested in both plates (agar) and liquid cultures.
* A power analysis was done by his department to determine the number of worms per agar culture and the number of experiments/replicates to perform.
* The R package ‘lifespan’ may be useful for analysis.
* Liquid culture samples are recorded as ratios of alive/dead worms.
* All samples, from both agar and liquid media, were taken on the same day.
* Agar data are recorded as raw numbers, starting with approximately 40 worms per plate.
* Liquid culture samples were drawn randomly with a pipette (~150mL, containing about 20 worms per measurement) and recorded as a ratio of alive/dead.
* Kaplan-Meier analysis was brought up as candidate, preferred but not required.
* Both agar and liquid populations came from the same population of eggs, and all treatments populations were measured at the same time intervals.
* Treatments (stressors) were added to the experimental units.
* Each treatment has three replicates, with three treatments per medium (control, copper, and DTT).
* **Goal**: Analyze the liquid vs. agar data by treatment. The aim is to compare analogous treatments between media and also compare each treatment to its respective control within the same medium.
  + Key question: Are worms dying more quickly in the treatment groups compared to their respective controls?

**Taryn**:

* Given the cross sectional idea of his data, is there a way to put it into a Kaplan Meyer analysis, and if not, what are our recommendations? (BH agrees).
* Make sure we can satisfy all of the conditions of KM based on the experimental procedure, if not what makes sense?

**KS Test**: Should we consider using the Kolmogorov-Smirnov test?

1. Next Steps:

**Bradford**:

* BH to send data (EOD 9/13).
* If we think all three conditions are needed he can provide data.

Consultants:

* Analyze whether the Kaplan-Meier procedure is appropriate.
  + Within media by stressor.
  + Between media by analogous stressors.
* What conditions need to be met for KM and if not what do we recommend?