



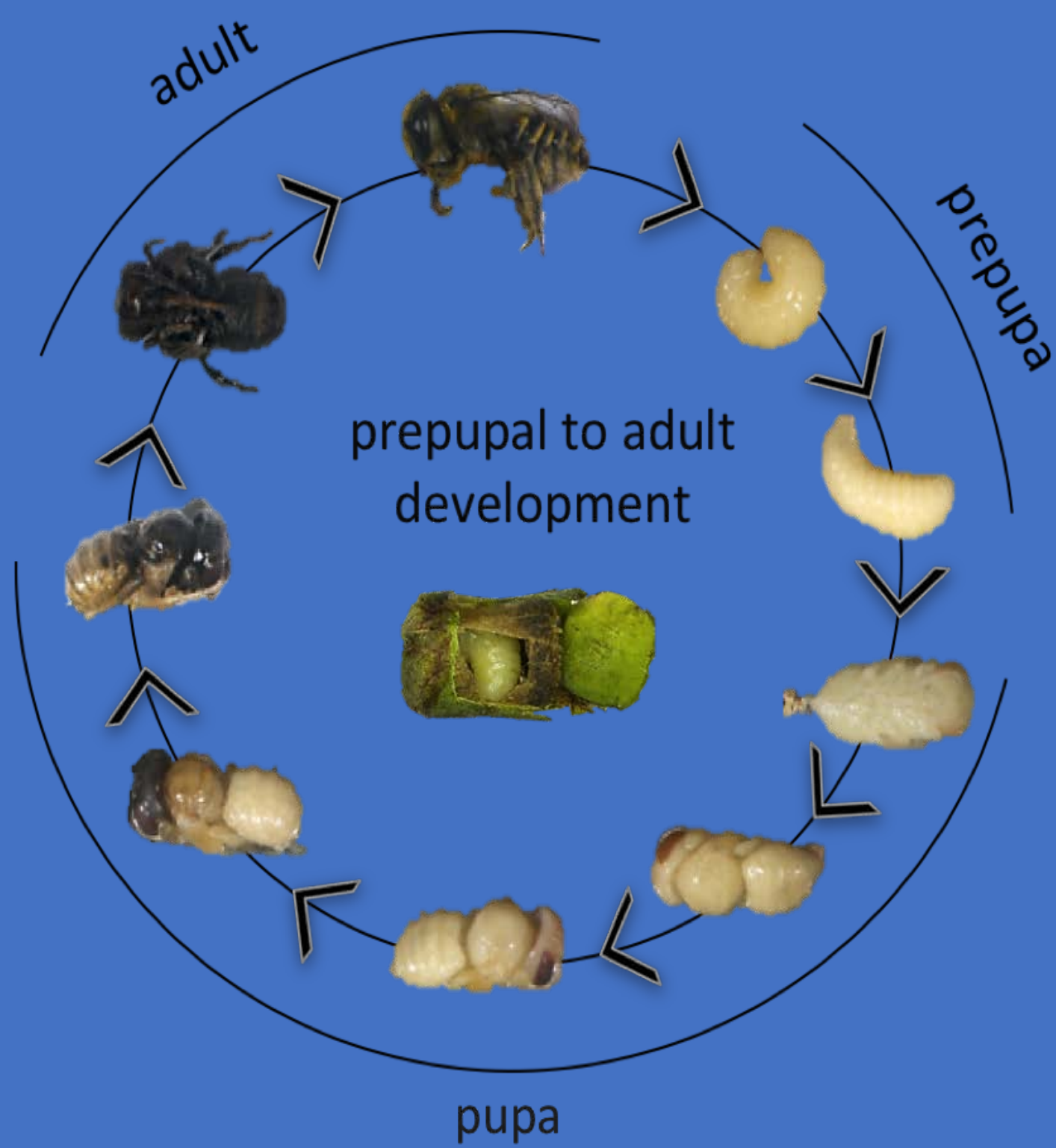
SEEING PAST HONEY: THE EFFECT OF X-RAYS ON SOLITARY BEES



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STAGES OF LIFE



INTRODUCTION

Alfalfa leafcutter bees, *Megachile rotundata* encapsulate themselves in leaves during development. We x-ray them to find parasites (wasp), pollen balls, and to check their development. This is important because as scientist we need to know if we were harming our bees. For this experiment no one has actually done many studies on the affects that x-rays may have on bees.

OBJECTIVE: Try to discover if by x-raying bees more than once at different times with the same intensity of 26 kv if this will impact their development.

RESULTS CONTINUED

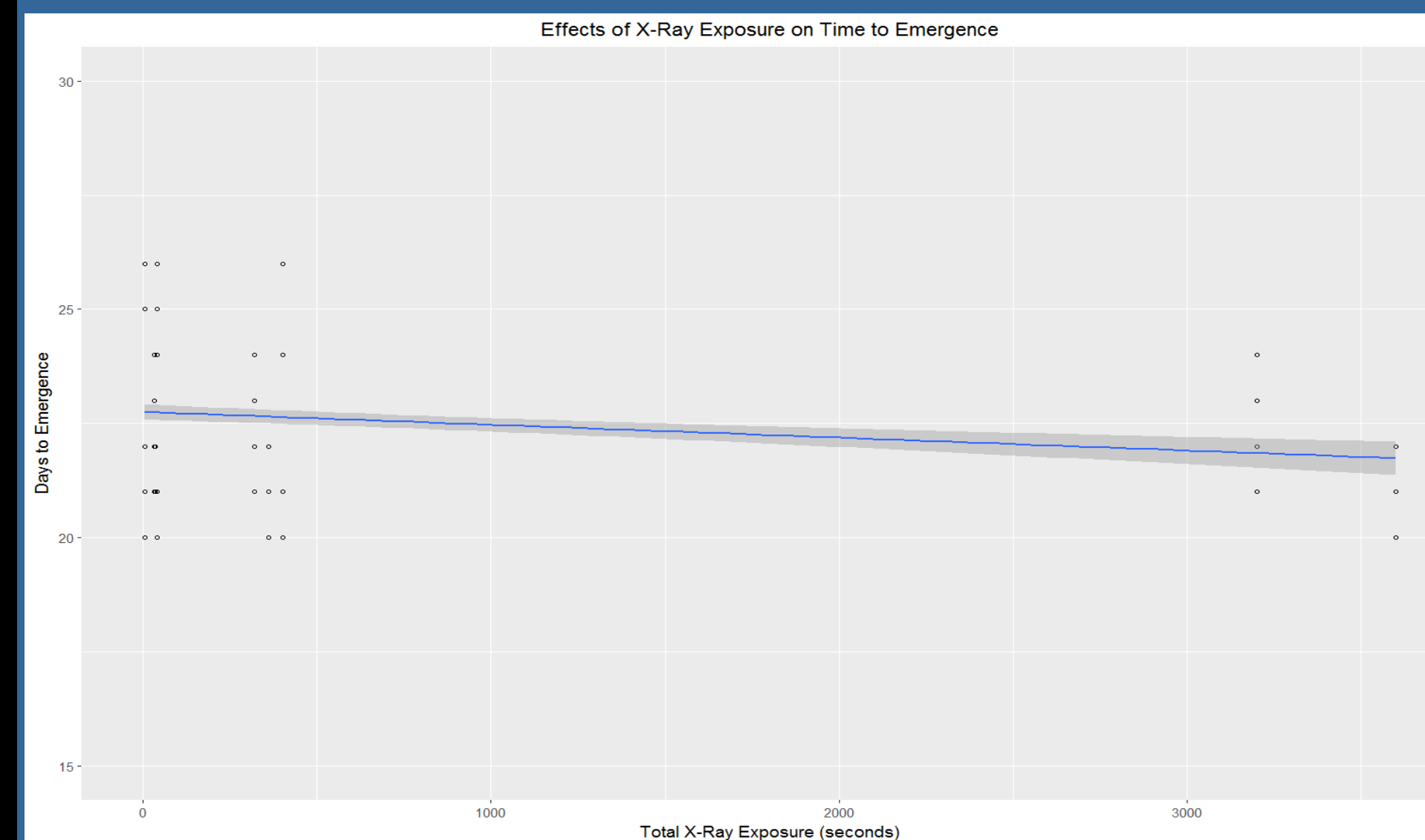
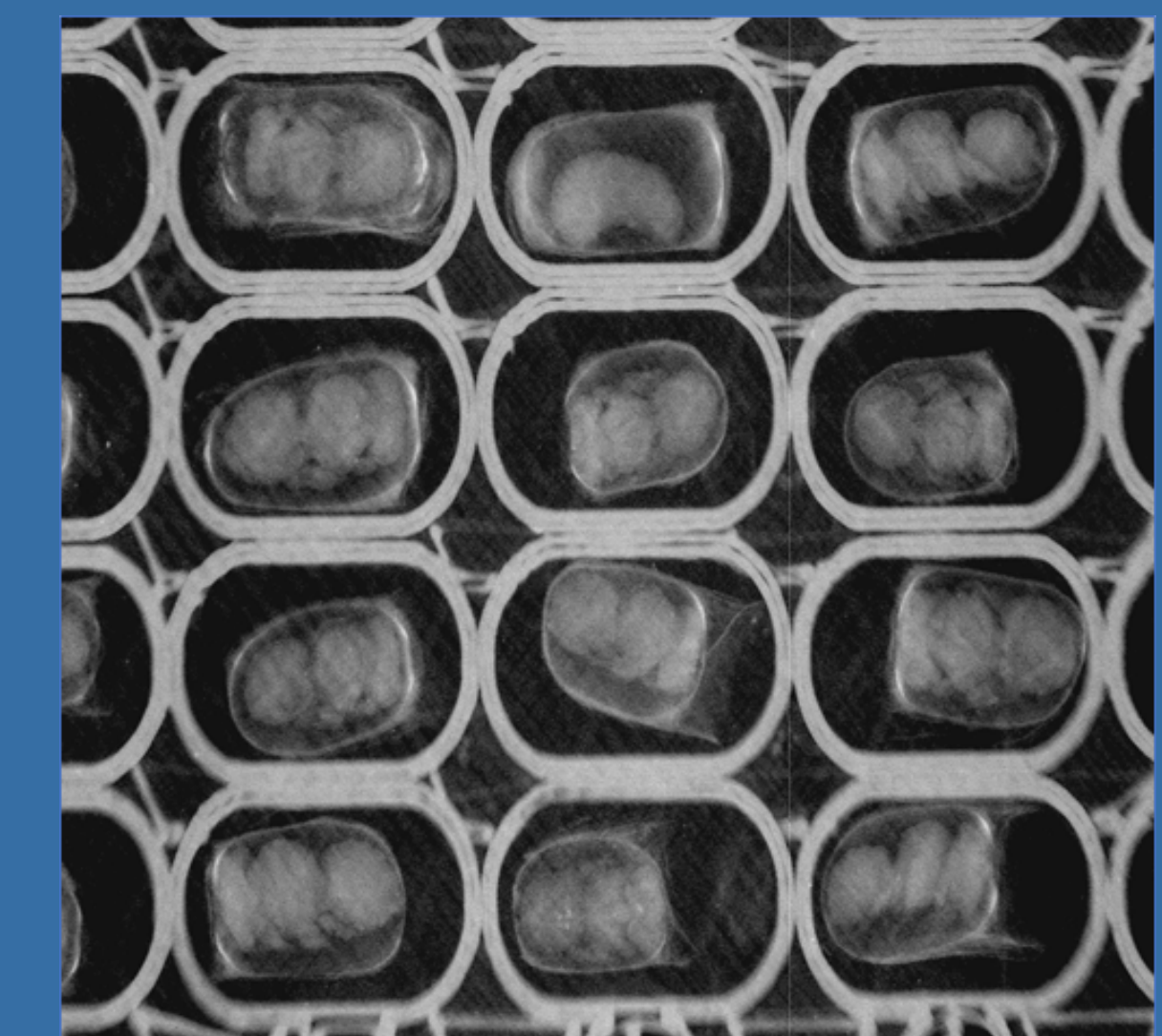


Figure 2. Total x-ray exposure by treatment. Duration and frequency of x-ray exposures and days until emergence

CONCLUSIONS

Throughout the x-raying in this experiment we found some pictures showed that the bees had still been in pre-pupa stage after being x-rayed 8 times. This can be seen in **Figure 1**. This observation lead us to believe that x-raying bees multiple times can slow their development or cause harm to the bees.



VARIABLE LENGTH X-RAY EXPOSURES DURING PUPATION

EFFECTS AND EXPOSURE TIME

Single exposure experiment

- Control (no x-ray)
- 4 second exp.
- 40 second exp.
- 400 second exp.

Multiple exposure experiment

- Control (no x-ray)
- MWF- 4sec, 40sec, 400sec
- MF- 4sec, 40sec, 400sec
- F- 4sec, 40sec, 400 sec

RESULTS

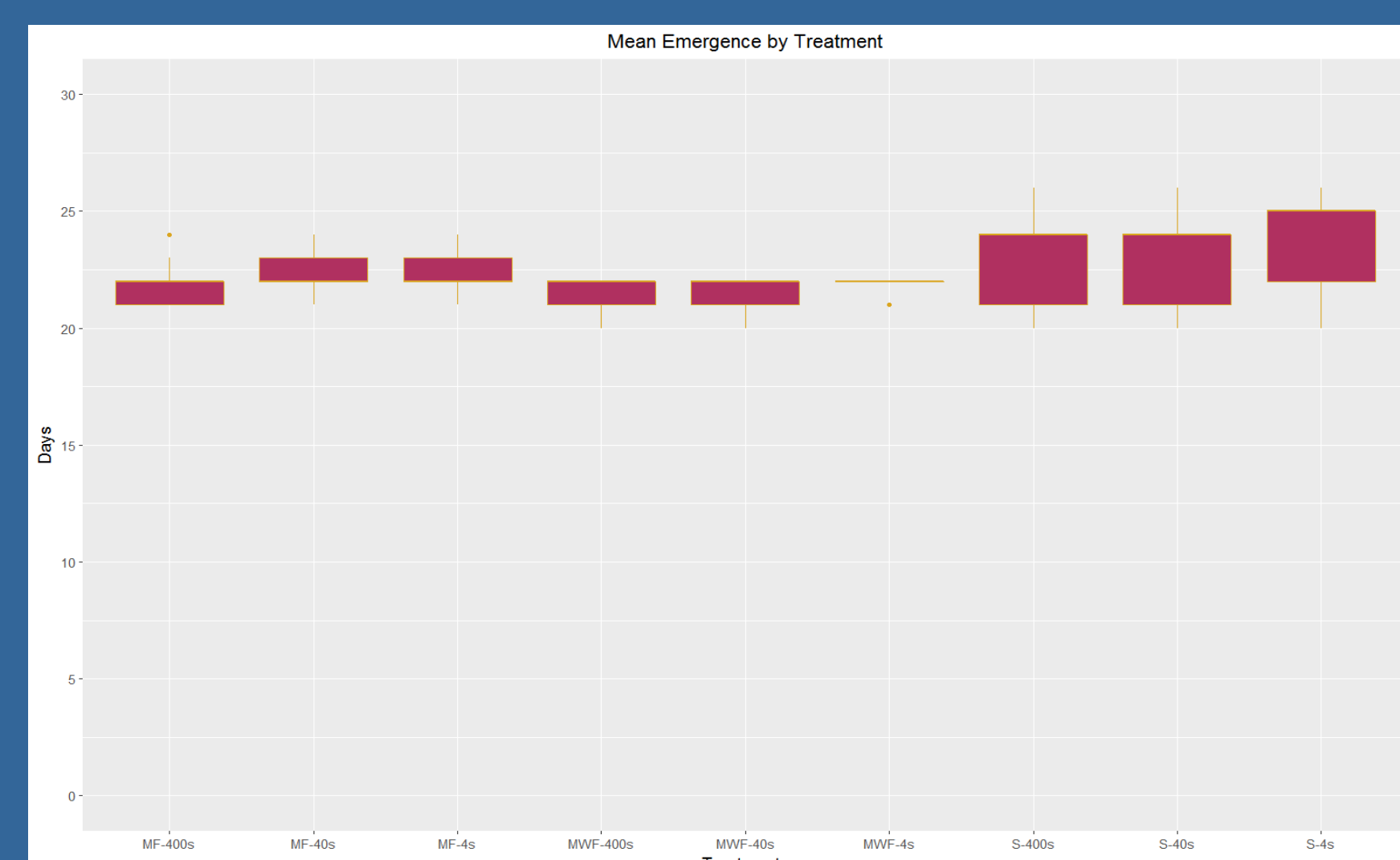


Figure 1. Emergence by treatment – The number and duration of x-rays and days until emergence

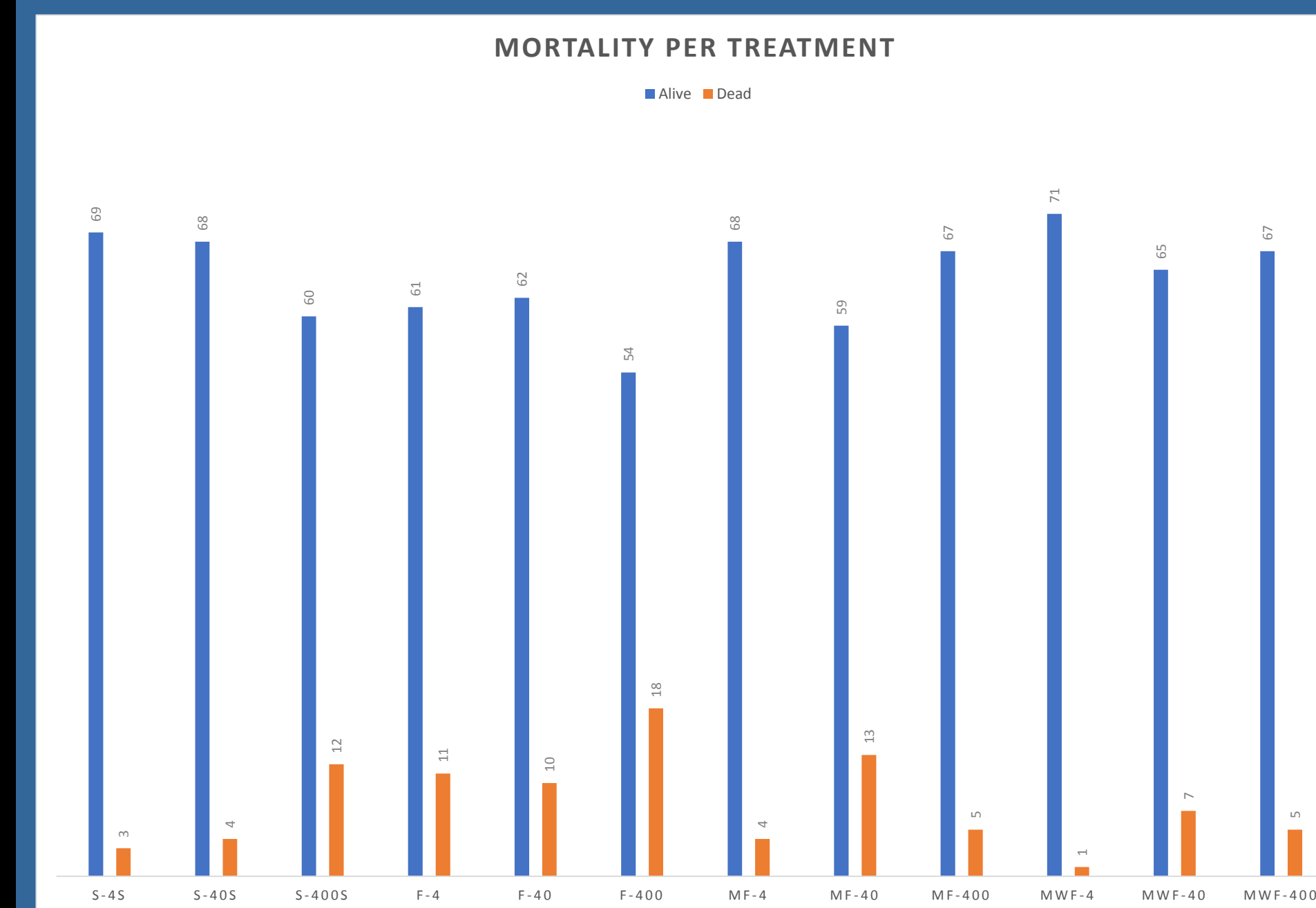
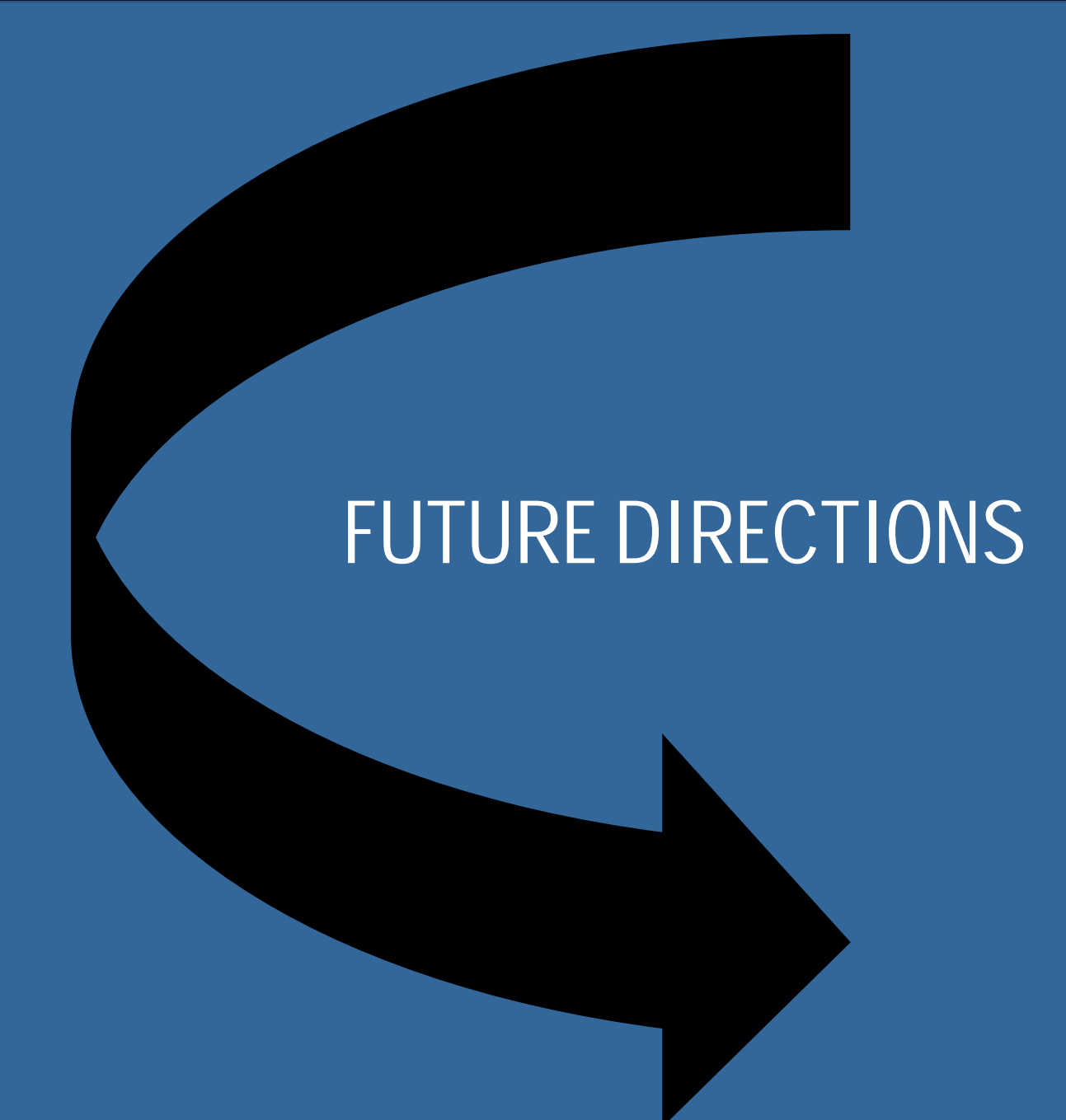


Figure 3. Mortality per treatment. The number of *Megachile* that failed to emerge or develop were counted as dead.

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We are going to determine the extent of damage that X-Ray exposure causes by performing:

- TUNEL assay to determine DNA damage and apoptotic cells
- Sperm viability using cy-14 and propidium iodide stain