

OrNV Transmission Experiment

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This experiment was performed to determine if OrNV isolate V23B can be transmitted from a dosed CRB adult to an undosed CRB adult.

```
@misc{grasela_guam_2020,
  title = {Guam {{CRB Biocontrol Project Technical Report}}: {{OrNV Transmission Experiment}}},
  author = {Grasela, James and Moore, Aubrey},
  date = {2020},
  url = {https://github.com/aubreymoore/OrNV-Transmission/blob/master/ornv-transmission.pdf}
}
```

1. Materials and Methods

1.1. Beetles

Beetles were field collected from pheromone sites and kept individually in moist peat moss in Mason jars. The jars were held under standard rearing conditions in an environmental chamber: 30 deg C; 80% RH; 12h photoperiod.

1.2. Virus and Dosing Method

Beetles were dosed per os with ca. 30 microlitre V23B virus preparation of unknown concentration (AgResearch, New Zealand).

1.3. Experimental design

To test for virus transmission, beetles were selected at random and assigned to 45 pairs with a male and a female in each pair. These pairs were housed in Mason jars half filled with moist peat moss. The jars were held under standard rearing conditions. At the start of the bioassay, the beetle pairs were randomly placed in 3 treatment groups of 15 jars each. Beetles were observed every other day.

1.4. Post-mortems

Dead beetles were dissected and images were made of guts using a cellphone camera. Note on pathology were recorded.

2. Analysis

Data were saved in a comma separated values text file, **OrNV-transmission.csv**. Analysis was performed using a Jupyter notebook, **OrNV-transmission.ipynb**.

Table 1: Treatment groups.

Treatment group	Treatment
Jars labeled C1 through C15	Experimental control; neither beetle was dosed
Jars labeled TF1 through TF15	Female was dosed with virus; male was not dosed
Jars labeled MF1 through MF15	Female was dosed with virus; male was not dosed

3. Results

Results from this experiment are inconclusive because of high control mortality (Fig. 1).

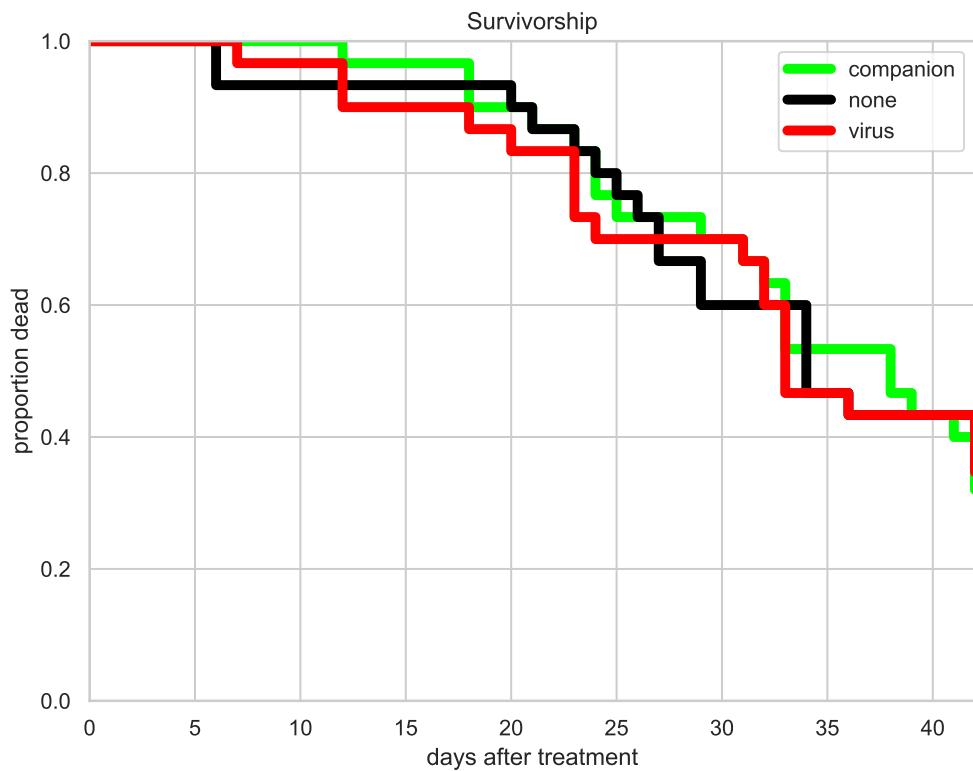


Figure 1: Survival of beetles after treatment.

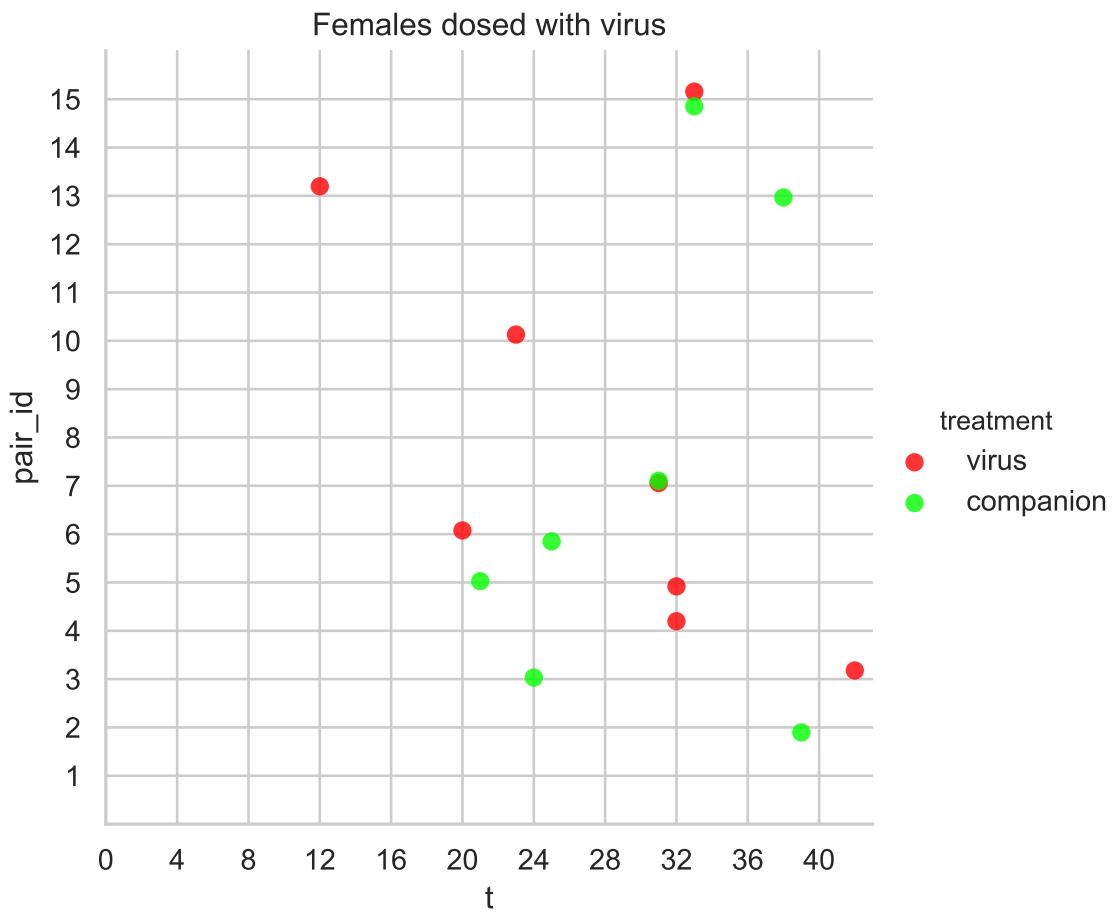


Figure 2: Mortality of beetles in jars where the female was dosed with virus. Points indicate time of death, in days after treatment, for dosed (red points) and undosed beetles (green points).

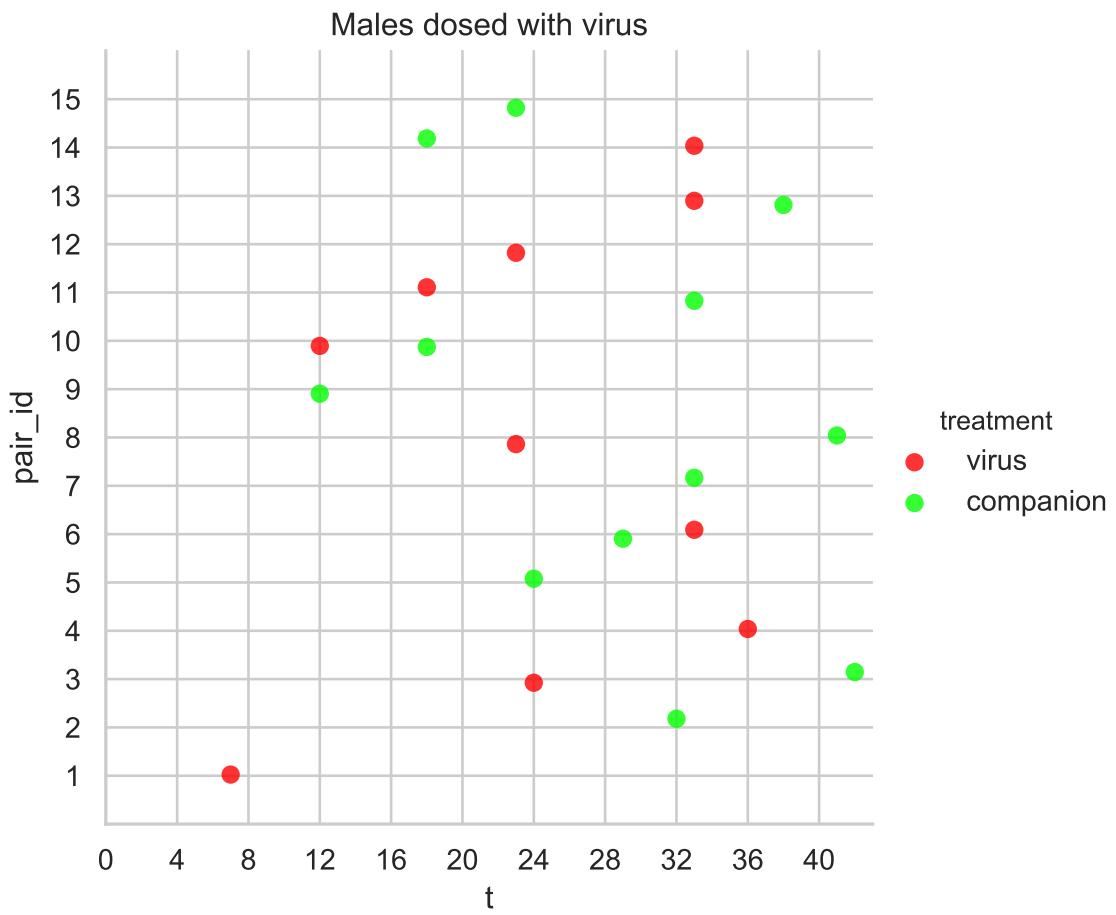


Figure 3: Mortality of beetles in jars where the male was dosed with virus. Points indicate time of death, in days after treatment, for dosed (red points) and undosed beetles (green points).

A. Data file: ornv-transmission-1.csv

```
jar_id,sex,treatment,date_treated,date_died,postmortem_virus,postmortem_bacteria,pm_image_filename
C1,m,none,2019-12-26,2020-01-16,,,20200116_110145_001.jpg
C2,m,none,2019-12-26,2020-01-29,,,20200129_145244.jpg
C3,m,none,2019-12-26,2020-01-19,,,20200119_121343.jpg
C4,m,none,2019-12-26,2020-01-21,,,20200121_112302.jpg
C5,m,none,2019-12-26,2020-01-29,,,
C6,m,none,2019-12-27,,,20200210_150730.jpg
C7,m,none,2019-12-27,2020-01-02,,,20200102_112827.jpg
C8,m,none,2019-12-27,2020-01-23,,1.0,20200123_163747.jpg
C9,m,none,2019-12-27,2020-01-25,,,
C10,m,none,2019-12-27,,,
C11,m,none,2019-12-27,2020-01-25,,,20200125_122409.jpg
C12,m,none,2019-12-27,,,20200211_095032.jpg
C13,m,none,2019-12-27,,,20200210_151921.jpg
C14,m,none,2019-12-27,,,
C15,m,none,2019-12-27,,,
C1,f,none,2019-12-26,2020-01-29,,,20200129_151721.jpg
C2,f,none,2019-12-26,,,20200210_145205.jpg
C3,f,none,2019-12-26,2020-01-29,,,20200129_161111.jpg
C4,f,none,2019-12-26,2020-01-31,,,20200131_113389.jpg
C5,f,none,2019-12-26,,,20200129_143353.jpg
C6,f,none,2019-12-27,2020-01-16,,1.0,20200116_110642.jpg
C7,f,none,2019-12-27,2020-01-02,,,20200102_112130.jpg
C8,f,none,2019-12-27,2020-01-23,,,20200123_163225.jpg
C9,f,none,2019-12-27,,,20200125_121834.jpg
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C13,f,none,2019-12-27,,,20200210_152419.jpg
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C15,f,none,2019-12-27,,,
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TF5,m,companion,2019-12-26,2020-01-16,,,20200116_111311.jpg
TF6,m,companion,2019-12-27,2020-01-21,,1.0,20200121_111727.jpg
TF7,m,companion,2019-12-27,2020-01-27,,1.0,20191229_120148.jpg
TF8,m,companion,2019-12-27,,,
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TF13,m,companion,2019-12-27,2020-02-03,,,
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TF1,f,virus,2019-12-26,,,
TF2,f,virus,2019-12-26,,,20200127_151015.jpg
TF3,f,virus,2019-12-26,2020-02-06,,,20200206_113817.jpg
TF4,f,virus,2019-12-26,2020-01-27,,,20200127_145553.jpg
TF5,f,virus,2019-12-26,2020-01-27,,,
TF6,f,virus,2019-12-27,2020-01-16,,1.0,20200116_112000.jpg
TF7,f,virus,2019-12-27,2020-01-27,,1.0,20200127_144326.jpg
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TF13,f,virus,2019-12-27,2020-01-08,,1.0,20200108_101434.jpg
TF14,f,virus,2019-12-27,,,
TF15,f,virus,2019-12-27,2020-01-29,,1.0,20200129_153605.jpg
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TM2,m,virus,2019-12-26,,,20200211_114845_001.jpg
TM3,m,virus,2019-12-26,2020-01-19,,,20200119_122916.jpg
TM4,m,virus,2019-12-26,2020-01-31,,,20200131_115718.jpg
TM5,m,virus,2019-12-26,,,
TM6,m,virus,2019-12-27,2020-01-29,,,
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TM9,m,virus,2019-12-27,,,
TM10,m,virus,2019-12-27,2020-01-08,1.0,1.0,20200108_102337.jpg
TM11,m,virus,2019-12-27,2020-01-14,,,20200114_105113.jpg
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TM13,m,virus,2019-12-27,2020-01-29,,,20200129_152333.jpg
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TM15,m,virus,2019-12-27,,,
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TM14,f,companion,2019-12-27,2020-01-14,,20200114_104047.jpg
TM15,f,companion,2019-12-27,2020-01-19,,,20200119_120121.jpg



Figure 4: Caption

B. Post-mortem images



Figure 5: Caption



Figure 6: Caption



Figure 7: Caption

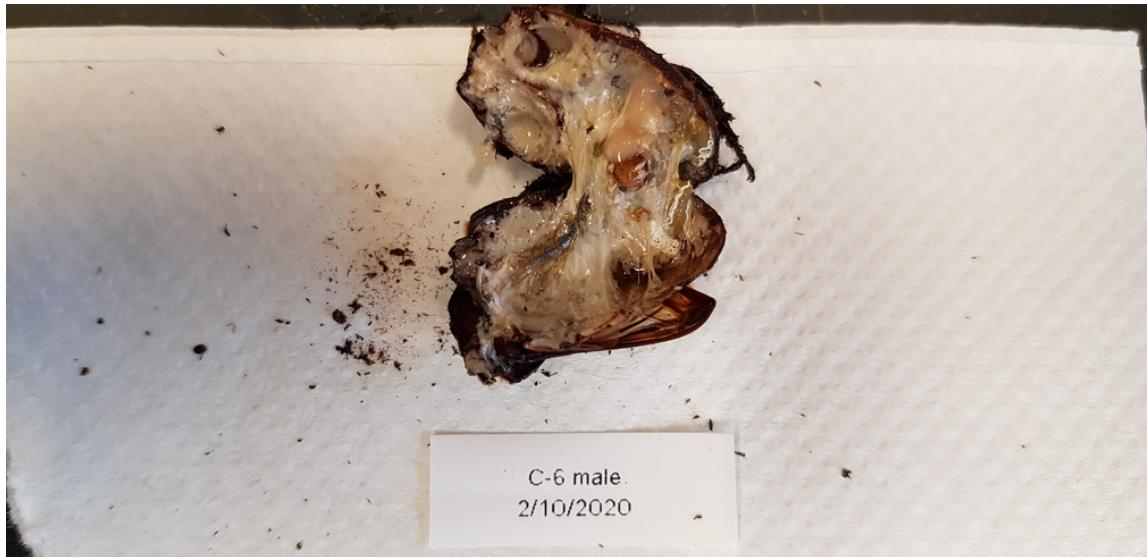


Figure 8: Caption



Figure 9: Caption



C-8 male
1/23/2020

Figure 10: Caption

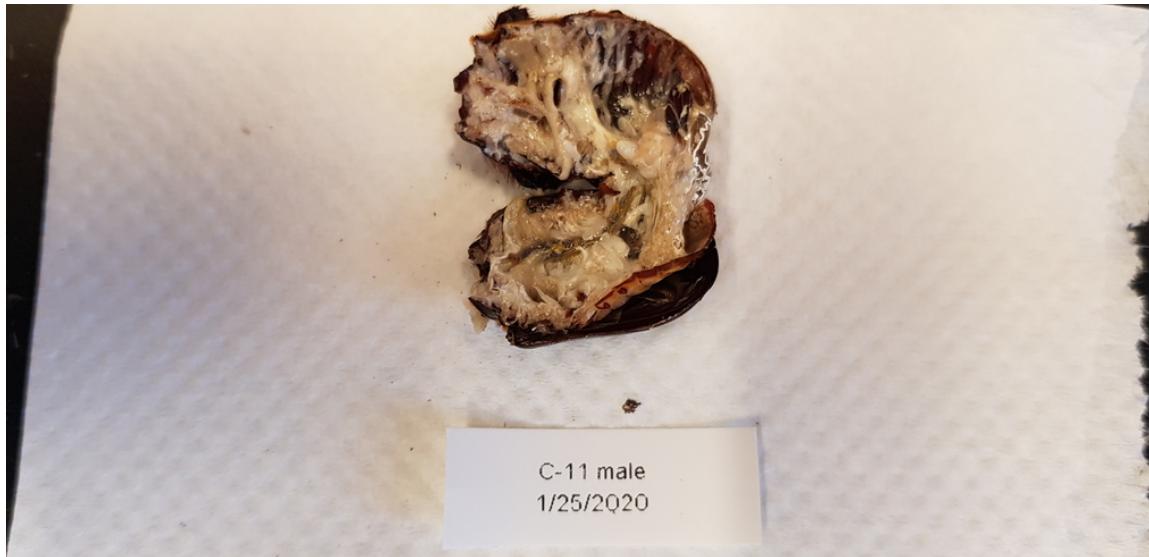


Figure 11: Caption



Figure 12: Caption



Figure 13: Caption



Figure 14: Caption



Figure 15: Caption



Figure 16: Caption



Figure 17: Caption



Figure 18: Caption



Figure 19: Caption



Figure 20: Caption

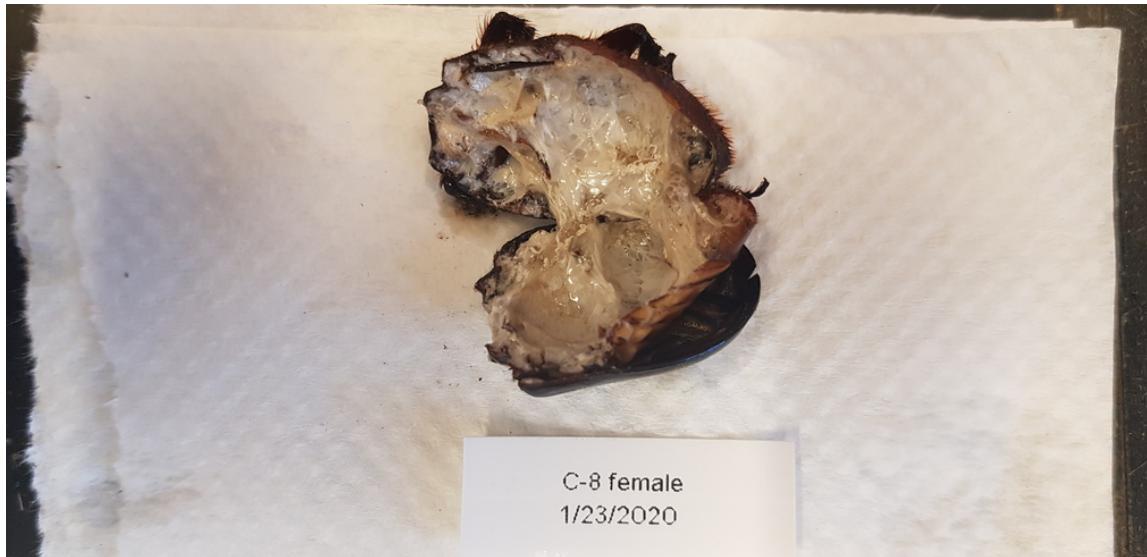


Figure 21: Caption



Figure 22: Caption



Figure 23: Caption



Figure 24: Caption



Figure 25: Caption



Figure 26: Caption

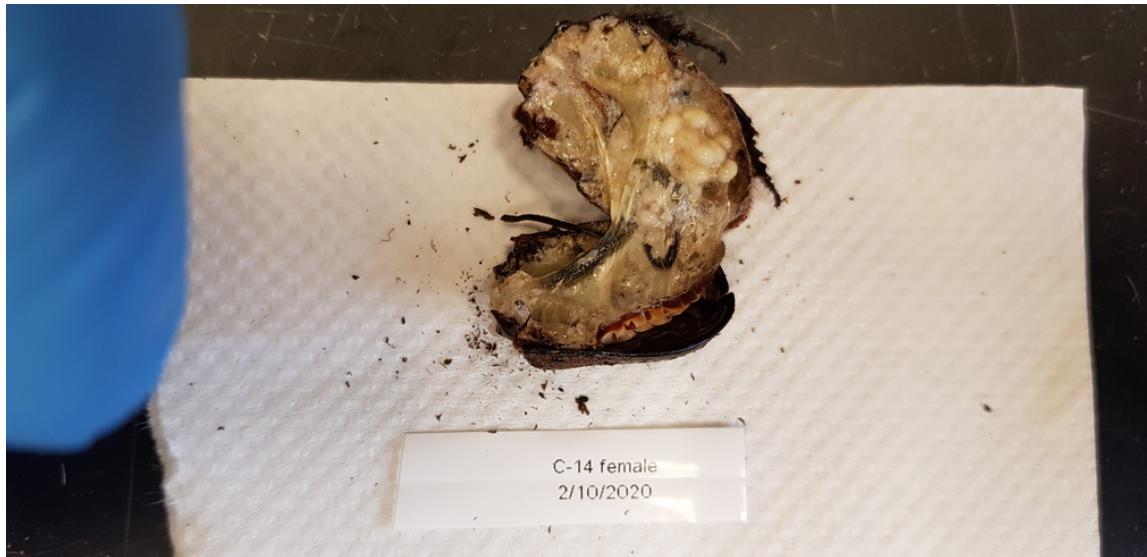


Figure 27: Caption



Figure 28: Caption



Figure 29: Caption



Figure 30: Caption



Figure 31: Caption



Figure 32: Caption



Figure 33: Caption



Figure 34: Caption



Figure 35: Caption



Figure 36: Caption

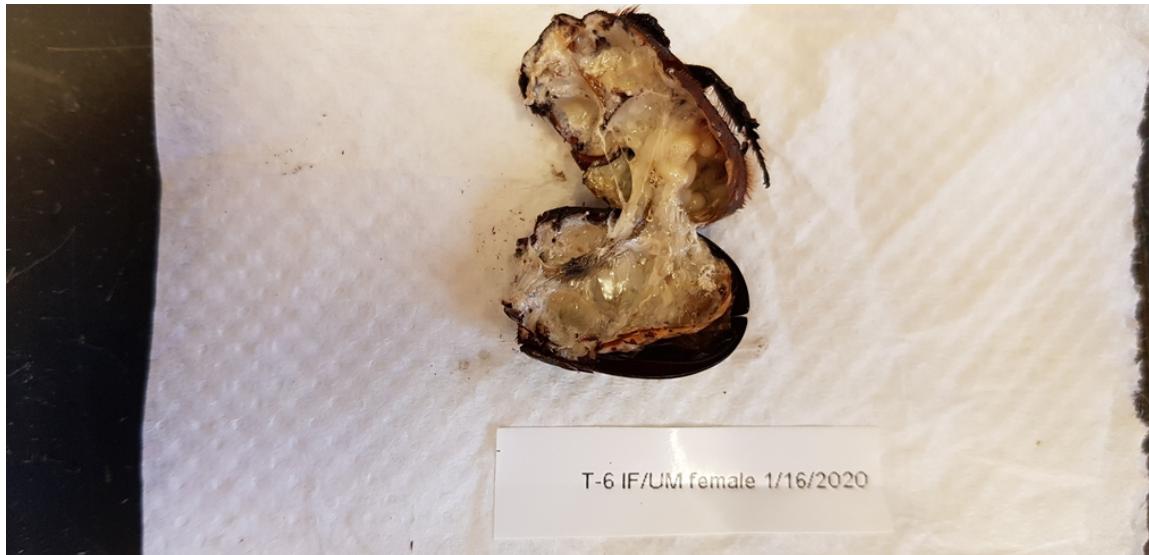


Figure 37: Caption



Figure 38: Caption

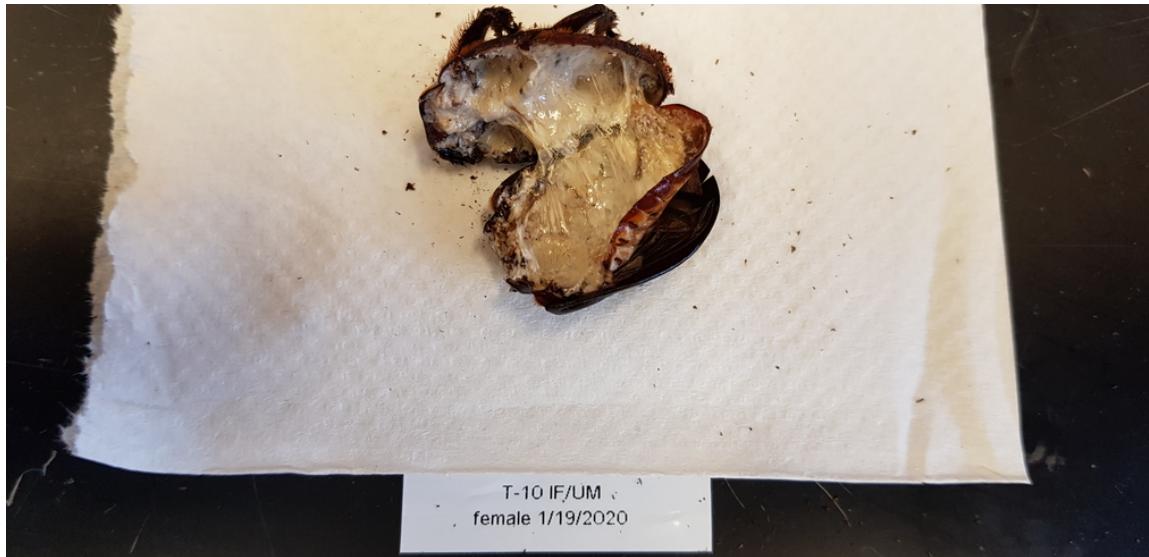


Figure 39: Caption



Figure 40: Caption



Figure 41: Caption



Figure 42: Caption



Figure 43: Caption



Figure 44: Caption



Figure 45: Caption



Figure 46: Caption



Figure 47: Caption



Figure 48: Caption



Figure 49: Caption



Figure 50: Caption

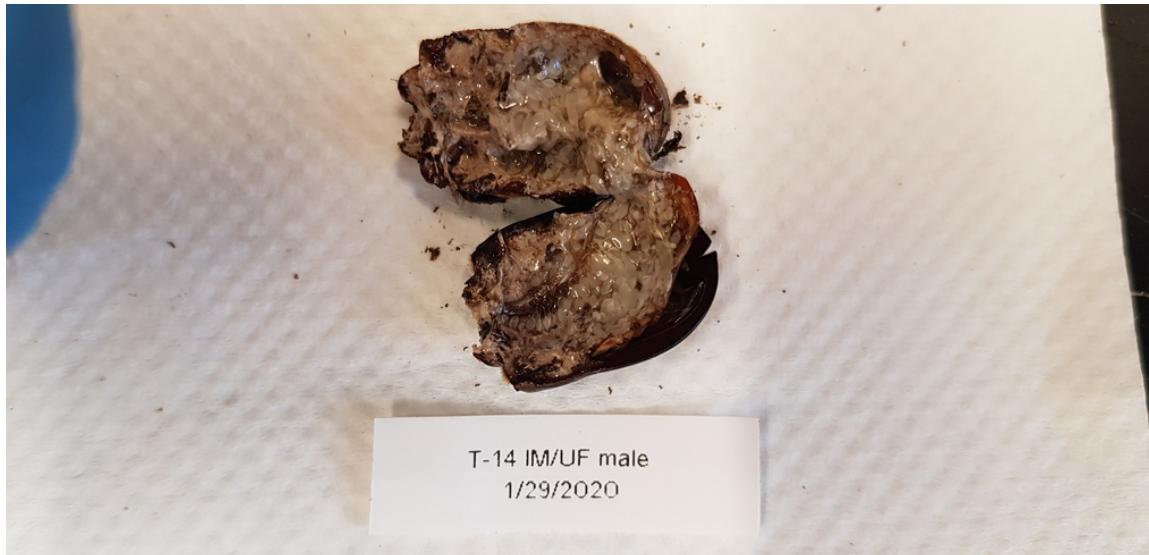


Figure 51: Caption



Figure 52: Caption



Figure 53: Caption



Figure 54: Caption



Figure 55: Caption



Figure 56: Caption



T-11 IM/UF female
1/29/2020

Figure 57: Caption



Figure 58: Caption



Figure 59: Caption



Figure 60: Caption