

# Biol 6317 Project 3

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**Note: Please include all your work, printouts of R code, etc, with your answer.**

## 1 Introduction

In this project, we study the effect of wing to body size ratio of fruit flies on their ability to escape from a spider. We test the hypothesis that flies with heavier bodies relative to their wing size are more vulnerable. Several fruit flies with low body to wing size ratio (classified as ‘Light’) were trapped in a jar with two spiders and observed over a period of 8 days. A similar experiment was conducted for fruit flies with high body to wing size ratio (classified as ‘Heavy’). Six different replicates of such experiments were conducted for each of the two types. Table 1 lists the total number of flies that were consumed, in all six replicates, during each consecutive 48-hour period, for each of the ‘Heavy’ and the ‘Light’ flies.

	Light	Heavy	Total
$\leq 48$ Hrs	16	27	43
48 - 96 Hrs	6	10	16
96 - 144 Hrs	7	6	13
144 - 192 Hrs	5	7	12
Alive after 192 Hrs	71	55	126
Total	105	105	210

Table 1: Number of flies consumed by wing loading

## 2 Hypothesis testing

Assume that the incidence is homogeneous within each of the 48-hour periods.

1. Does the incidence rate stay constant over time? Determine this by estimating the incidence rate of consumption within each 48-hour period for the combined population (Light + Heavy).
2. Run an appropriate test to determine if the ‘Heavy’ flies are significantly **more** vulnerable than the ‘Light’ flies. Decide which test to use and what part of the information reported from the experiments is relevant to create your statistic. Report the p-value for the test.

You may perform the calculations by hand or use a computer code for the above test. Please attach the calculations performed or a hard copy of the computer code used. Using built-in R functions that perform such a test is not advised, unless you are absolutely sure that the function does the correct calculations.