

Adult Longevity Test by Sex in *Chrysomya rufifacies* (Macquart) (Diptera: Calliphoridae)

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A study was conducted to observe adult longevity by sex in *Chrysomya rufifacies* (Macquart) (Diptera: Calliphoridae). Currently, the adult longevity between *Chrysomya rufifacies* has yet to be studied. This blow fly is forensically important since they are the second arthropod species that arrives within ten minutes after death. The *Chrysomya rufifacies* larvae were reared in the laboratory to adulthood. Once they emerged, adults were analyzed to determine their sex. Sugar and water were fed to them daily until they died. The longevity of the *Chrysomya rufifacies* was observed from adulthood until death to determine whether males or females live longer. Using a T-test in SPSS it was found that *Chrysomya rufifacies* males live significantly longer than females. Males had an average of 34 days while females had an average of 23 days. While longevity of *Ch. rufifacies* depends on many factors, in this experiment it was found that *Ch. rufifacies* males live longer than females.

Keywords: Chrysomya rufifacies, Diptera, Calliphoridae, Longevity,

Chrysomya rufifacies (Macquart) (Diptera: Calliphoridae) has recently been introduced as an invasive species of blow fly that was first reported in the United States in 1978 (Baumgartner 1993). The introduction of non-native species in different environments can have ecological, economic, and genetic effects (Lee, 2012). *Chrysomya rufifacies* is originally from Australia and the Orient but since its introduction to the United States, it has established itself in the southern region of the USA throughout the year (Rosati, 2017). *Chrysomya rufifacies* is known as the hairy maggot blow fly due to characteristic fleshy protrusions on the larvae (Baumgartner 1993). As adults, they are robust flies metallic green in color with a distinct blue

hue (Shiao, 2008). The family Calliphoridae is generally the first arthropod species that colonizes a body after four minutes of death (Byrd 1998). Most of the information known is about their feeding and breeding habits. Their larvae are known for being forensically important in that they are usually the first insects to show up on a carcass and even human corpses in Texas and can be used to determine the postmortem interval (Byrd 1998). *C. rufifacies* also have the ability to prey on other dipteran larvae thus eliminating any competition around the food source and possibly removing any native carrion flies (Rosati, 2007). Determining the adult longevity of these flies can contribute to the

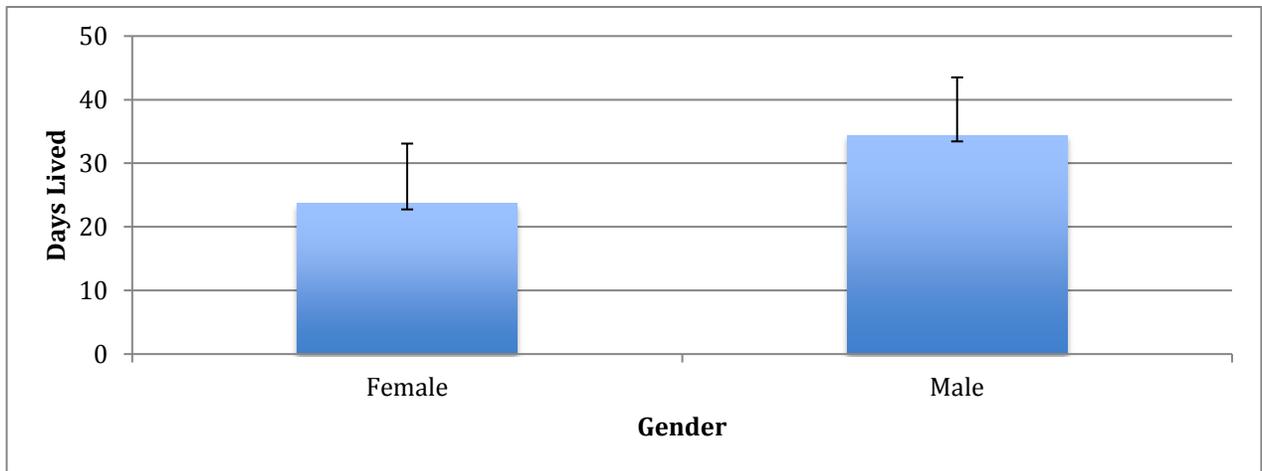


Figure 1 Mean Longevity by Gender

little known information that is available on *C. rufifacies*.

Materials and Methods. Wild *C. rufifacies* larvae were collected from carrion on the side of FM 2818 in College Station, Texas. They were raised on food-grade bovine liver (Rosenthal's, Texas). Once they matured into adults, they were then placed in a 12 x 12 x 12 cage (BioQuip, California) and were fed sugar and reverse osmosis (RO) water *ad libitum*. When the adults were 3 days old, they were given bovine liver as a protein meal. Then when they were 5 days old, they were given bovine liver on which to oviposit. After oviposition, the eggs were left on the liver as the larvae began to grow and develop. The liver was placed onto a bed of sand (Quikrete, Georgia) in 1 pint mason jars (Ball, Fishers, Indiana) and the larvae were given extra liver as needed. Once the larvae pupated, the pupae were gathered and weighed individually and were then placed at room temperature until emergence in individual 2 ounce portion cups with lids (Diamond, Minnesota). Once they emerged,

the adults were sexed. The adults were then fed 0.05 cc of 10% sugar water, which was made by mixing sugar (Domino, New York) with RO water, every day until the adults died. The number of days the adults lived was recorded and the data were analyzed using a T-test in SPSS.

Results. There was a significantly higher amount of *C. rufifacies* females than males (Fig 1). The females lived for a range of 2-43 days while the males lived for a range of 4-46 days. There was a mean of 23 days for females and 34 days for males, each with a standard deviation of about 9 and a standard error of about 1.7(Fig 2) .

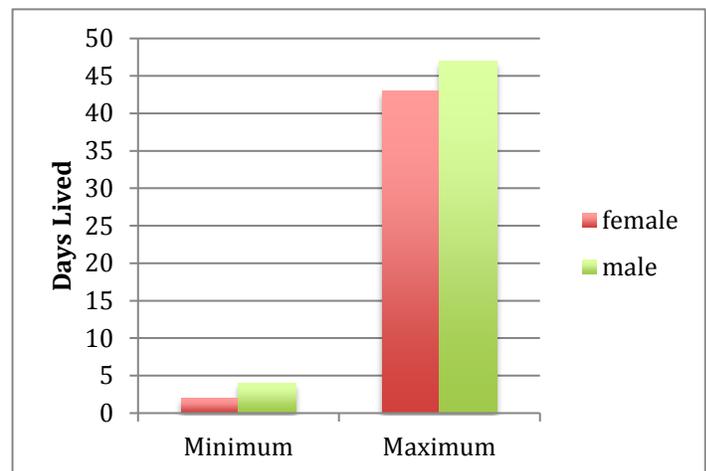


Figure 2 Range of Days Lived by Gender

Discussion.

While there are many factors that effect the longevity of the *C. rufifacies* (temperature, genetics, and type of nutrient). For this experiment, the males lived significantly longer than the females. A study has shown that *C. rufifacies* can live 23-30 days, however the flies tested lived, at the most, 47 days (Baumgartner 1993). The flies that were tested in lab may be more evolved than the flies studied for the study referred to previously. The males probably live longer

than the females so that they can mate as many times as possible to keep their lineage going. More tests should be done, using both wild and laboratory reared specimens, to verify the results found in this study because this is the only study done on *C. rufifacies* adult longevity. Since the longevity of *C. rufifacies* depends on many factors some possible ways to improve this experiment is to study wild *C. rufifacies* and observed them in their natural environment compare to a laboratory rearing.

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