

# **Territoriality in dragonflies: Common basket-tail**

## ***(Tetragoneuria cynosura)***

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### **ABSTRACT**

The purpose of this study was to find a correlation between the wingspan of common basket-tails (*Tetragoneuria cynosura*) and the area of the males' territory. A small sample of males was collected and monitored, and territory was marked with surveyor's flags. There appears to be no significant correlation between wingspan and size of territory with this species of dragonfly.

### **INTRODUCTION**

Territoriality in males is a common phenomenon found in many types of animals, from insects to lions (Moore, 1952; Mosser, 2009). The species of focus in this study is the common basket-tail (*Tetragoneuria cynosura*) (Mead, 2003). The main benefit of having a territory is ultimately linked to fitness; territorial males have higher reproductive success, in terms of copulation frequency and female oviposition, than satellite males (Moore, 1952). Sexual dimorphism is another documented factor of mating and territorial success in damselflies, a similar organism; larger males more easily acquire and maintain their sites (Serrano-Meneses, 2007). This has been shown to be the case in other insects, such as the wasp (Alcock, 2000). The quality of a territory is also an honest indicator of the male's fitness; the winner of territorial disputes ends up with more access to females as a resource (Moore, 1952; Resende, 2008).

In addition to site quality, wing length seems to be the most important factor in determining dragonfly territory occupation (Switzer, 2002). This study will hold site quality as a constant variable by monitoring only the territories in the same stretch of clearing and no more than eight feet above the ground. Our prediction is that males with a larger wing length will have a larger area of territories.

## **MATERIALS AND METHODS**

All dragonflies were collected on site at the University of Minnesota Biological Station and Laboratories at the Itasca State Park location. Specimens were obtained with butterfly nets and then measured with calipers to the nearest mm. Permanent marker was applied to the right forewing of each specimen for identification.

Territorial behavior was observed before and after capture, and quantified with a series of flags in the ground to mark the boundaries. By using two measuring tapes, the area was found by converting it into a series of triangles and using the standard  $\frac{1}{2}$  base times height property.

## **RESULTS**

The regression line showed a 0.6 positive correlation between wingspan and territory for the five males studied ( $R^2 = 0.644$   $R^2 < 0.95$ ; Figure 1). Results showed a trend of a larger wingspan with a larger territory. An analysis of variance (ANOVA) was run based on our data points ( $df_{1,3} = 5.42$ ,  $p=0.102$ ).

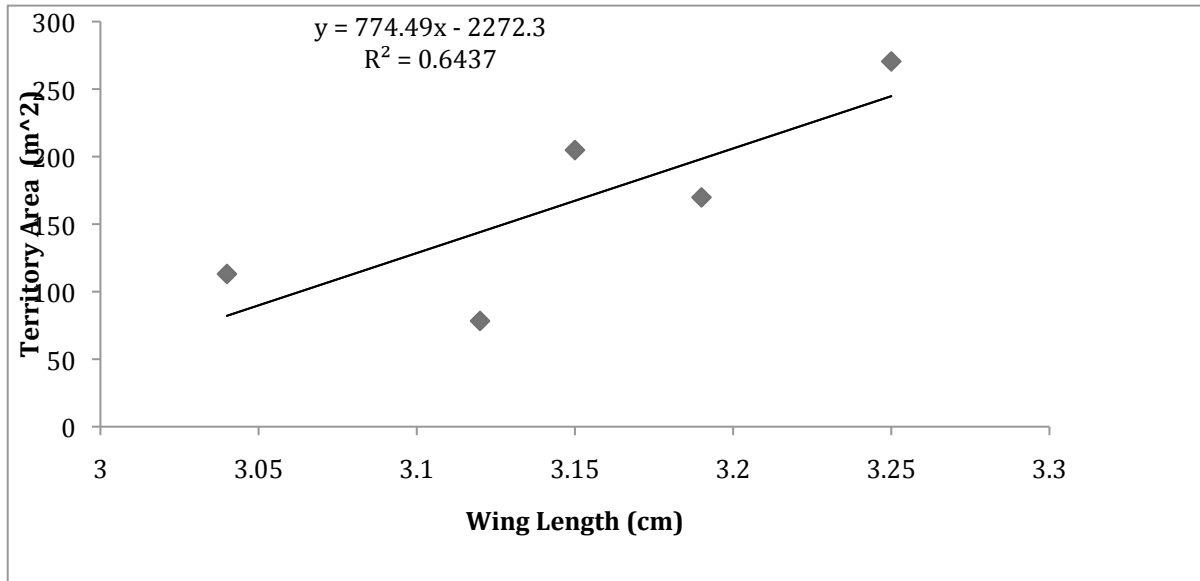


Figure 1. Wing Length and Territory Area

## DISCUSSION

As wingspan increased in common basket-tails, territory size tended to increase as well. However, there was insufficient data to establish a statistically significant correlation. Although there is very little literature analyzing wingspan and territory size in dragonflies, there have been documented instances of this in pompilid wasps (Alcock, 2000). The damselfly, a more closely related relative of the dragonfly, has also shown to show a positive correlation between male body size and site acquisition, though there is no data on the size of the territory (Serrano-Meneses, 2007). The hypothesis models the behavior of other organisms; a larger male would be able to afford the cost of defending a larger territory. Recent literature supports this theory, although the opportunity for the invasion of satellite males may not be worth the extra territory (Eason, 2004).

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