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**WEATHER CONDITIONS AND AGGRESSIVE  
BEHAVIOR IN TERRITORIAL SONG BIRDS**

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**ABSTRACT**

Breeding male birds sing more frequently to mark territories on days that are sunny and calm, known colloquially as ‘Bluebird days’. Humidity levels can alter acoustics and can dramatically increase the range that bird calls can be heard in the wild (Lengagne and Slater 2004). With this experiment we sought to test this phenomenon further in order to discover if it extends to aggression towards rival birds in established territories of birds of the same species.

**INTRODUCTION**

Singing behavior to secure prime habitat is vital to the reproductive success of male territorial birds, because in doing so male birds will attract a greater amount of nesting females (Krishhnan et al. 1997). In order to successfully deter males of the same species, these boundaries must persistently be drawn with species-specific songs and rival males confronted and repelled (Brown 1969, Weeden and Falls 1959, Eriksson and Wallin 1986).

Three song birds: the Ovenbird (*Seiurus aurocapillus*), the American Robin (*Turdus migratorius*), and the Red-eyed Vireo (*Vireo olivaceus*) were observed in this experiment. Each of these birds shares common habitats, diets, and bears altricial young (Howell 1942, Parker 1987). Our hypothesis was that aggressive responses to their respective calls would decrease in cloudy or rainy weather.

## **METHODS**

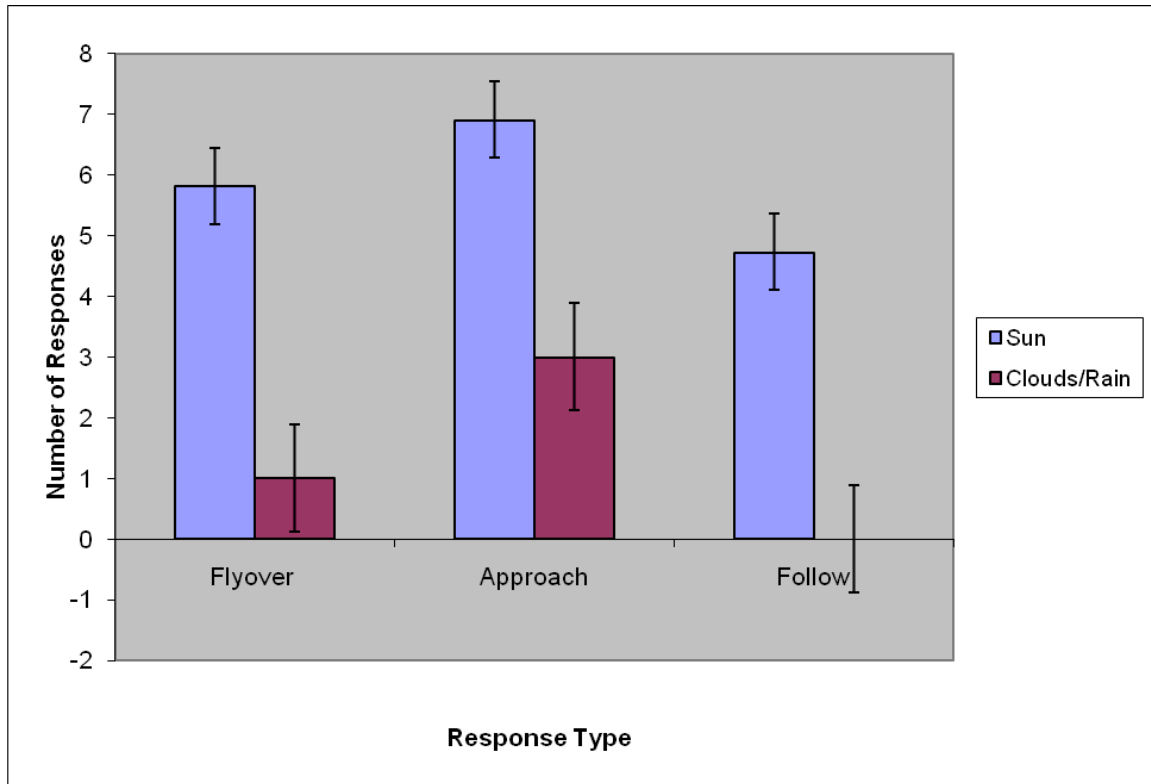
Between the dates of 6/9/2009 and 6/26/2009 thirty total observations were recorded on the behavior of three species of bird common in and around Itasca State Park. These observations were taken at intervals along a seven-mile stretch of wilderness drive as well as along a 1-hectare transect grid in the Bear Paw area of Itasca State Park where males of each species were known to have territories, in order to prevent the observation of the same bird twice.

After a bird was spotted singing its characteristic territorial song, the song was recorded and played back to it. The bird was considered receptive if hearing its own song caused it to stop in the middle of its own song and listen to the recording. For birds that were spotted but not aggressively singing, a recording was played to them of their territorial song as sung by another bird in the park.

After the bird was determined to be receptive to the song, the apparatus and experimenter were concealed from direct view under vegetation and this procedure was repeated five times. The time, date, and details of the current weather conditions were recorded for each observation, as well as three aspects of the bird's behavior as viewed through high-powered binoculars: whether or not it would fly over to investigate the rival bird's song, whether or not it would approach the recording, and whether or not it would follow the recording if it were played in five different areas around where the bird had been observed to be claiming territory.

## **RESULTS**

The results of this study show a clear correlation between weather and aggressive response. All three types of responses were more frequent in sunny weather than cloudy or rainy, and overall response was much higher with sunny weather. Statistically, the results for each type of behavior seemed accurate ( $p < 0.05$ ).



*Fig 1. Number of responses  $\pm$  SE for each response type*

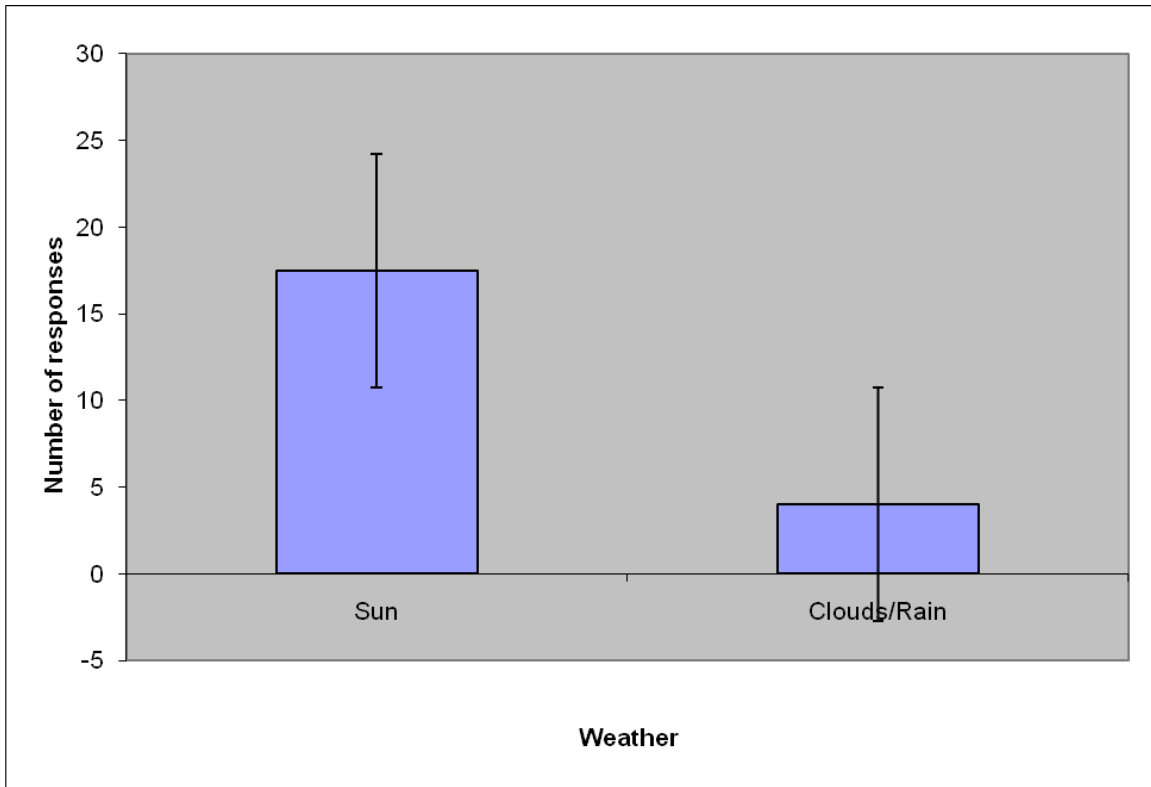


Fig 2. Overall comparison of number of responses  $\pm$  SE by weather conditions

## **DISCUSSION**

The results of this study support our hypothesis that aggressive response would decrease in unfavorable weather. When comparing specific behaviors, approaches were the most common in both types of weather. This could be because the action is not especially aggressive, and can just be a sign of curiosity. Follows were the least common response; going by previous logic, this would be because it is a focused behavior, only executed if the call has garnered sufficient interest or aggression from the bird. One main reason that aggressive responses were significantly decreased during weather times of clouds or rain is that acoustics are warped in these weather conditions (Lengagne and Slater 2004). It would make sense that birds would avoid vocalization when there is a

chance it would be misinterpreted or carried unfavorably. Another reason birds may avoid aggression during cloudy or rainy weather is higher energy cost (Garson, 1979). Flying or any movement in adverse conditions would utilize more energy than the same action in calm weather; birds may be more careful about challenging others during cloudy or rainy weather for this reason. A potential source of error in this study is observation error. Several birds may have been present in the same location which may have skewed response data if this was not recognized, or the birds may have left the area or acted differently due to human presence. Also, the data gathered may have been more accurate with more trials for each species of bird, leading to a species comparison instead of just general response levels for all three species; the species comparison may have shown different levels of activity.

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