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Magellanic Woodpecker (*Campephilus magellanicus*) behavior when approached by humans in the context of ecotourism

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Background/Question/Methods
Given that it is a charismatic species, watching Magellanic woodpeckers (*Campephilus magellanicus*) is an increasingly popular ecotourism activity in the Cape Horn Biosphere Reserve, southern Chile. To assess the impact of bird watching we experimentally tested the response of free-living woodpeckers to the simulated precense of a visitor. We monitored the number of: trees used, pecking, calls uttered, prey extracted, as well as the foraging height on trees, distance moved between trees, and the rate of movement toward the observer of focal birds. We recorded these variables by approaching seven male woodpeckers: first from a moderate distance (30-40 m) and then by constantly approaching the birds as a tourist would do. To test for habituation to tourists, this methodology was repeated five times on five individuals.
Results/Conclusions
Results showed that only the pecking rate decreased significantly when the visitor appoached. Although not significantly, the number of calls and visited trees increased, as well as the distance traveled between trees. Additionally, the rate of movement toward the observer decreased when the woodpeckers were disturbed. Unexpectedly, woodpeckers showed no behavioral habituation to tourists. Our results suggest that watching Magellanic woodpeckers should be conducted from moderate distances, greater that 30 m.

Magellanic Woodpecker (*Campephilus magellanicus)* responses when approached by humans in the context of ecotourism

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ABSTRACT

Given the high interest in observing Magellanic woodpeckers by ecotourists visiting the Cape Horn Biosphere Reserve, in southern Chile, we simulated the effect of a visitor and assessed the response of free-living woodpeckers. We monitored the number of: tree used, pecking, calls uttered, prey extracted, as well as the foraging height on trees, distance moved between trees, and the rate of movement toward the observer. We recorded these variables by approaching 7 male woodpeckers: first from a moderate distance and then by constantly approaching the birds as a tourist would do. On 3 birds we did this on 5 occasions to test habituation to tourists. Results showed that only the pecking rate decreased significantly with the disturbance, whereas the number of trees used tended to increase. Although not significantly, the number of calls increased, the distance traveled between trees increased, and the rate of movement toward the observer decreased when the woodpeckers were disturbed. Woodpeckers showed no habituation for the variables assessed. Our results suggest that ecotourism can affect woodpecker behavior, at least in the short term. However, direct observations of the birds can be conducted from moderate distances.

Fig. 1. People observing a Magellanic woodpecker in southern Chile.

INTRODUCTION

The Cape Horn Biosphere Reserve has increasingly drawn the attention of ecotourists (Fig. 1). Due to its continuous growth, ecotourism is an important activity of the region, but with various potentially detrimental impacts on species and ecosystems. Since 2005, following the designation of the Cape Horn Biosphere Reserve, the Magellanic Woodpecker (*Campephilus magellanicus)* (Fig. 2) has been considered the emblematic species and was experimentally found as the most charismatic species of this region. This bird is one that many people – including residents of the area and tourists from all around the world – want to get a chance to see when visiting the Sub-Antarctic Forests on Navarino Island (see in Fig. 3). In this study we experimentally tested the response of this large woodpecker to a simulated tourist during the Austral summer of 2013.

MATERIALS AND METHODS

We assessed the impacts of ecotourism on the Magellanic Woodpecker by experimentally recording this bird's behavior when exposed to a motionless observer as opposed to a tourist's movements trying to observe birds closely. We first

Fig. 2. Male and female Magellanic woodpeckers.

monitored 7 male woodpeckers on Navarino Island between January and March of 2013. Additionally, we repeated the same procedure on 3 of the males, but in 5 different instances to test for habituation. Upon encountering the woodpecker families during each visit, the observer remained standing and motionless for a period of 20 min and recorded the adult male's number of: trees used, pecking, calls uttered, prey extracted, as well as the foraging height on trees, distance moved between trees, and the rate of movement toward the observer. Thereafter, during another 20 min, the observer continuously approached the woodpecker, recording the same variables while speaking, and taking pictures, just as a tourist would do. We compared woodpecker responses under these two settings to determine how ecotourism may stress woodpeckers and change their behavior.

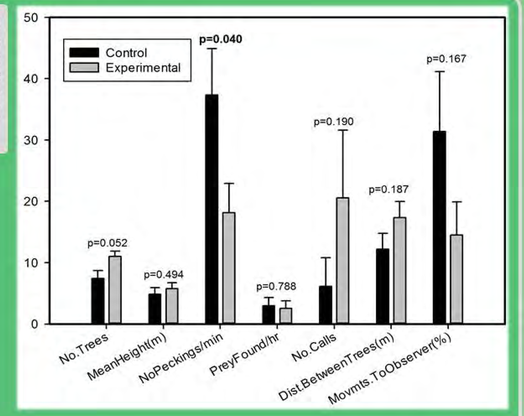
We used paired t-tests to test for differences in each variable's control and experimental scenarios. To test for habituation, we used linear mixed-effects models to determine temporal changes in the behavioral responses of Magellanic woodpeckers, being the individual the random effect. We expected that if habituation would occur, the level of the experimental variable should approach that of the control.

Fig. 3. Cape Horn Biosphere Reserve.

RESULTS

Although we observed some trends in behavior, woodpecker significantly changed its pecking behavior on an approaching tourist (Fig. 4). The number of trees visited, the number of call uttered, and the distance moved between trees increased in the treatment situation, whereas the rate of movement toward the observer decreased. Regarding habituation, although we observed different behaviors between controls and experimental settings (Fig. 5), none of them was significant nor showed a trend as expected under our hypothesis.

Fig. 4. Behavioral responses of Magellanic woodpeckers when approached by a tourist (n=7). Only the number of pecking decreased significantly.



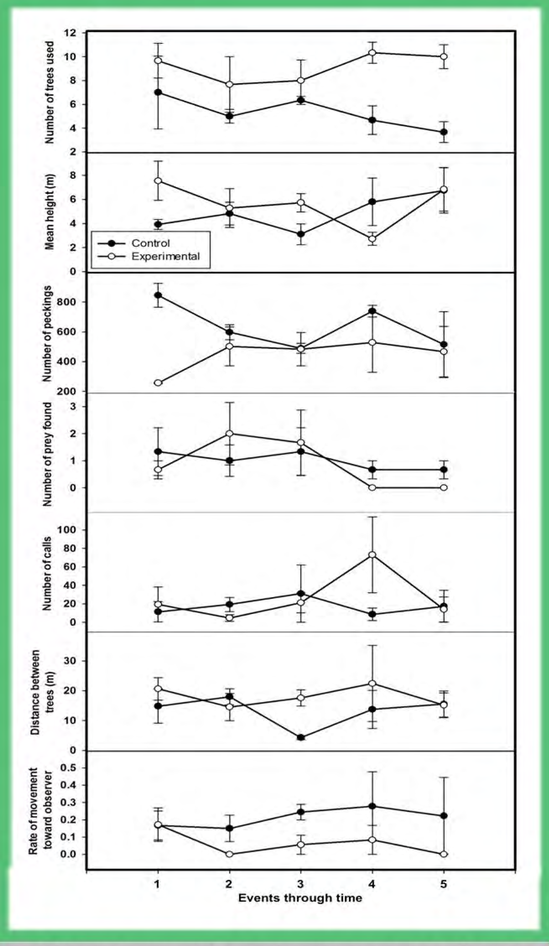


Fig. 5. Behavioral responses of Magellanic woodpeckers throughout 5 repeated visits when approached by a tourist (n=3).

Table 1. Time slope parameters representing cumulative temporal changes in the behavior of male Magellanic woodpeckers when observed from the distances versus when approached closer by a person.

Behavioral Response	Treatment	Slope	Std. Error	p-value
Number of Trees	Control	-0.80	0.35	0.032*
	Human presence	0.43	0.35	0.232
Mean Height in the Tree	Control	0.13	0.36	0.728
	Human presence	0.14	0.36	0.708
Number of Pecking	Control	13.47	33.54	0.691
	Human presence	-20.67	33.54	0.543
Number of Prey Extracted	Control	-0.22	0.17	0.204
	Human presence	-0.28	0.17	0.100
Number of Calls	Control	1.23	4.18	0.771
	Human presence	4.67	4.18	0.274
Dist. Mov. Between Trees	Control	-0.95	1.33	0.481
	Human presence	0.35	1.33	0.794
Mov. Toward Observer	Control	2.40	2.30	0.309
	Human presence	-2.61	2.30	0.269

DISCUSSION

Contrary to our expectations, Magellanic woodpeckers did not change behavior substantially when approached by a person. They pecked less when encountering an ecotourist for the first time, and were forced to switch between trees more often. Although this would affect feeding rate and would result in more energy spent by switching trees more frequently, the number of larvae extracted did not differ significantly. Thus, at least, in the short term, there seems to be no effect by an approaching person on the woodpecker behavior. The lack of significance in the response could be due to the small sample size and the large difference in the behavior of different individuals. Likewise, the birds did not respond as it would be predicted under a scenario of habituation to the observer, as no variables approached the value presented by the control. Further, the only significant trend was observed in the control for the number of trees used. This is puzzled as we would expect that the control would remain even over time. Part of the reason might be that these woodpeckers were already habituated to researchers, as 4 of the males in this study were studied by other researchers during the months previous to this research. We propose that using a larger sample size of woodpeckers monitored for a longer period might show a response to people. Also, a more direct fitness measure should be examined in birds subjected to different levels of disturbance by approaching people. Thus far, there is no evidence that points out that woodpeckers will respond negatively to ecotourism.

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