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Document Version

Early version, also known as pre-print

Publication date:

2010

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Ubels, R., Radersma, R., Fokkema, R., & Tinbergen, J. (2010). *Reproductive effort affects spatial distribution in Great tits*.

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Reproductive effort affects spatial behaviour in Great tits

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Introduction

A previous study in our Great tit population in the Netherlands showed that the cost of reproduction depended on the social environment. Parents facing increased reproductive effort may have lost competitive ability relative to other birds in the population and thereby survived less well.

We manipulated reproductive effort in 2009 and studied the spatial behaviour of parents in the spring of 2010

If parents with increased reproductive effort become less competitive, we expect them to lose their territory and reside further from their breeding nest box the following spring



Methods

We manipulated reproductive effort of parents in the breeding season of 2009 by altering their brood size (reduced / control / enlarged) at day 6. All birds were individually marked with colour rings.

In the spring of 2010 we studied spatial behaviour of manipulated parents. During weekly observations from the beginning of March until the beginning of May, we registered the identity of the bird and the coordinates of their location (Fig. 1).

We analyzed the distance between the observed location in the spring of 2010 and the breeding box in 2009 in relation to the brood size manipulation.

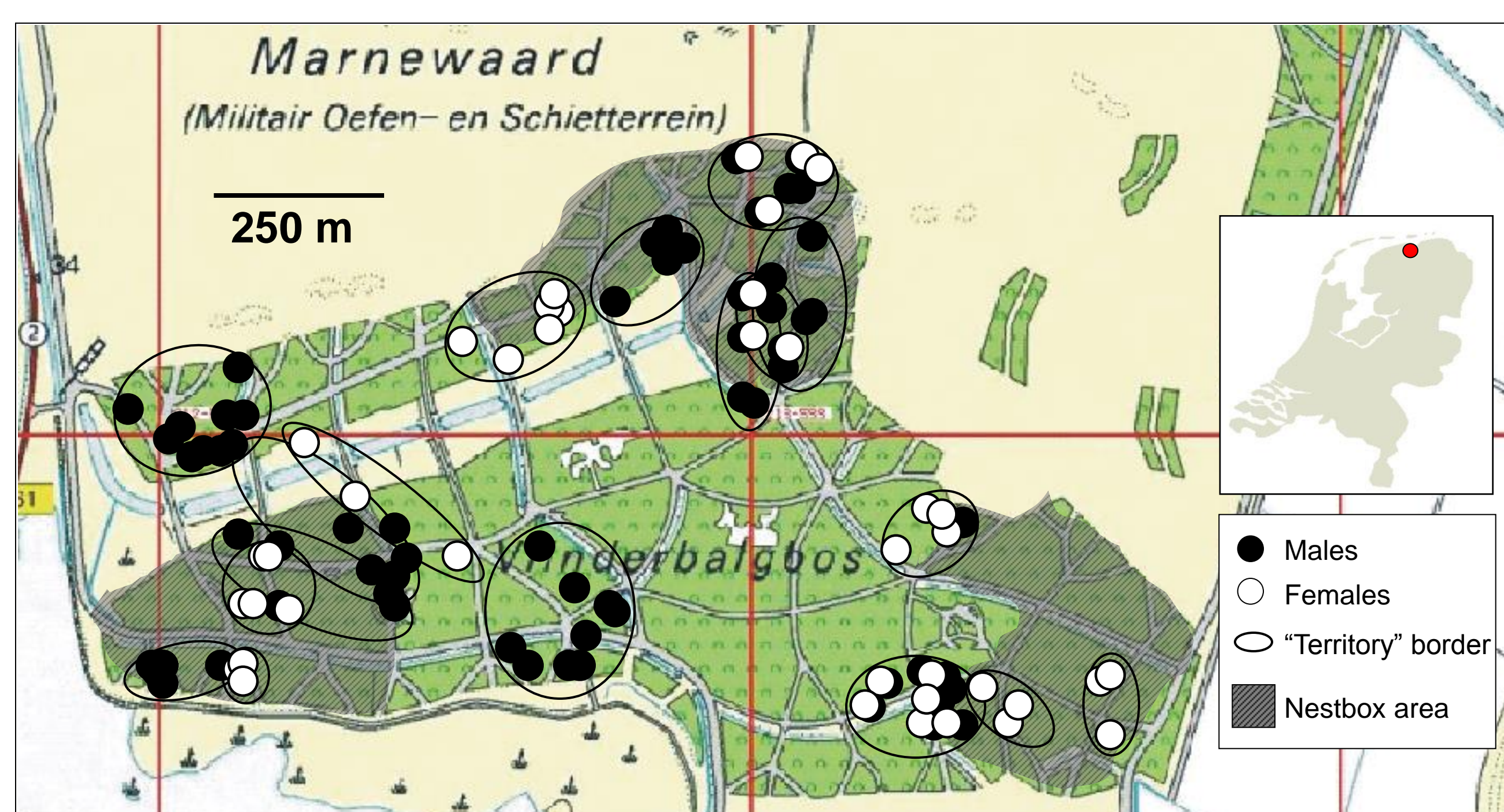


Figure 1: Distribution of manipulated adult Great tits in spring 2010 in the Lauwersmeer's study site.

Results

The distance between the observed location in spring 2010 and the breeding box in 2009 significantly increased with manipulated brood size. (mixed model with variance at nestbox and individual level, controlled for observation week ($p < 0.001$) and sex (NS), $\chi^2: 10.954$, $df=1$, $p < 0.001$, figure 2).

We did not find an effect of increased reproductive effort on the survival probability of parents.

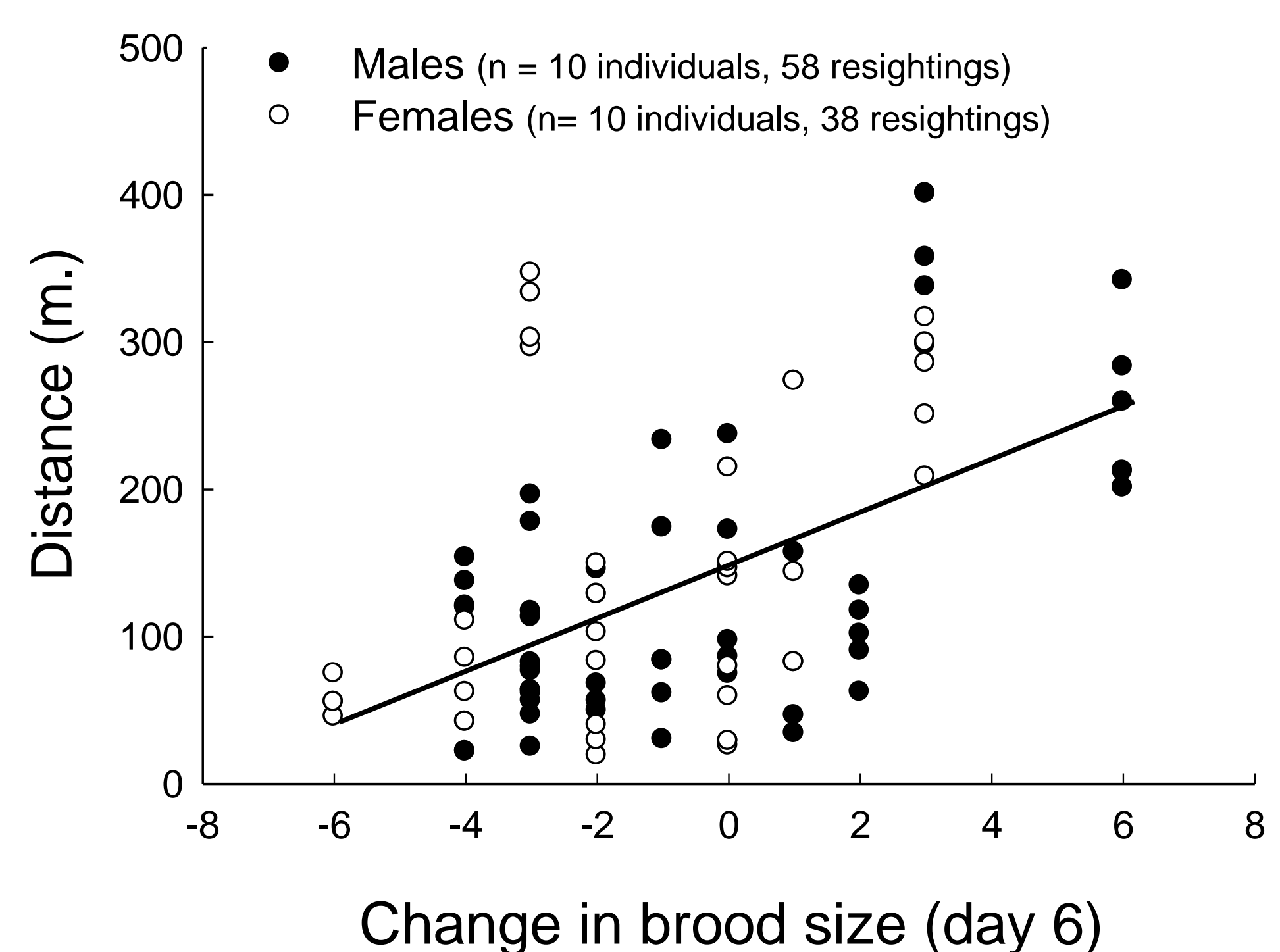


Figure 2: The relationship between the distance between the observed location in spring 2010 and the breeding box in 2009 and the change in brood size

Discussion

As expected, parents with increased brood size were seen further from their breeding box in the spring after.

Unlike the previous study, we did not find any effect of the brood size manipulation on adult survival. The fact that we did not manipulate the social environment might explain the lack of survival cost of reproduction.

Our results suggest that parents with increased reproductive effort lose competitive abilities. Depending on environmental conditions (e.g. level of competition) this could translate in survival costs (Nicolaus et al., submitted) or loss of territory (this study).



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Acknowledgments: We are grateful to Staatsbosbeheer and the Royal Dutch Army "Koninklijke Landmacht" for their permission to work in the Lauwersmeer area and the stay in the army base. Sander Bot helped collecting data. Marion Nicolaus provided useful comments.