

## Are there more ground-dwelling invertebrates inside than outside Grasshopper Warbler *Locustella naevia* territories?

*Finns det fler marklevande evertebrater inom eller utanför gräshoppsångares Locustella naevia revir?*

JONAS ENGZELL

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### Abstract

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I investigated differences in the number of ground-dwelling invertebrates inside as compared with just outside Grasshopper Warbler *Locustella naevia* territories, using glue traps. No statistical difference was found in the total number of invertebrates caught. There was, however, a significantly higher number of spiders within territo-

ries. This may indicate that spiders are an important food source for Grasshopper Warblers, or that spider density indicates other territory qualities for Grasshopper Warblers.

Jonas Engzell, Ågatan 18, 29538 Bromölla, Sweden.  
E-mail: joengzell@hotmail.com

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### Background

There are several sources that provide information about the diet and feeding behaviour of the grasshopper warbler *Locustella naevia*. According to Kennerley & Pearson (2010), the grasshopper warbler “feeds from low stems or among dead leaves and other ground debris”. Another source describes that it feeds mainly on “insects; also spiders (Araneae), some small molluscs. Feeds while moving actively through low vegetation. Gleans from stems, working from top to bottom. Forages also on ground; searches among dead leaves” (del Hoyo, Elliot & Christie 2006). And a search on Wikipedia gives this information; “The common grasshopper warbler is insectivorous, feeding on a wide range of invertebrates. Its diet includes flies, moths, beetles, aphids, dragonflies and mayflies and their larvae. Spiders and woodlice are also eaten and the chicks are fed on aphids, green caterpillars, woodlice and flies” (Wikipedia.org 2016).

My aim with the present study was to investigate whether there are more ground-dwelling invertebrates inside territories occupied by Grasshopper Warblers than in nearby areas just outside occupied territories.

### Materials and methods

The study was carried out in the nature reserve

Björka lertag (Natura 2000 sites: SE0240078 Björka lertag, SE0240134 Vissberga lertag. Object number RegDOS: 2000249. Central coordinates (RT90): X 6554548, Y 1460369). Björka lertag is located in Kumla, Närke, in southern Central Sweden, and it is a former clay-pit that now has been turned into a reed- and bush-dominated wetland.

The fieldwork was carried out during the breeding season of 2016. I monitored and ringed singing grasshopper warbler males from 5 May to 6 June. The singing positions of males were used to determine the location and size of each grasshopper warbler male’s territory in the study area. In 2016 there was a total of 6 singing males in Björka lertag. Of these, one male switched territory after a while. A seventh male was heard singing in an additional, (8th) territory one night, but was not heard thereafter. This latter (8th) singing site was not considered as an occupied territory in the present study.

I used glue traps to measure abundance of invertebrates on the ground. The glue traps have been designed to detect insects in homes etc., and I used AF Insect Monitor (black) with glue pads. Glue pads for these traps can be with or without invertebrate-attracting odour. I used glue pads without attractant. In total, 20 traps were placed in the study area. Of these, 8 traps were placed close to (within 5m of) singing positions of the six territorial males. The remaining 12 glue traps were randomly placed



The study area, a former clay-pit. Glue-traps were placed on the ground covered with vegetation. After three days they were collected and opened and the number of different invertebrates was counted.

*Försöksområdet, ett tidigare lertag. Klisterfällor placerades på marken täckta av vegetation. Efter tre dagar samlades de in och öppnades de och antalet evertebrater av olika slag räknades.*

in the study area. They ended up between 43 and 115 meters from the singing position of the closest male (mean distance 71 m). The traps were placed on the ground, so that both new and old vegetation covered the traps to ensure that they stood firmly on the ground. The traps were in place from the morning of 6 June to late evening of 8 June.

After collecting the traps the total number of invertebrates caught per trap was noted. In addition, I also counted the total number of ants, spiders and beetles separately. All other invertebrates, found in small numbers in the traps, were grouped into "other invertebrates" and also counted.

## Results

The total number of invertebrates caught in the traps was 497. Of these 414 were ants, 36 spiders, 5 beetles and 42 other invertebrates. Ants dominated the catch and represented 82% of the total number of caught invertebrates.

In this study there was no statistically significant difference between traps close to singing males and traps far from singing males, regarding the number of ants, beetles, "other invertebrates" or the total number of caught invertebrates. However, the number of caught spiders was significantly larger within territories (i.e., close to singing grasshopper warbler males) than in traps outside territories (i.e., 43–115 m from singing males; Mann-Whitney U-test,  $U = 6$ ,  $P < 0.05$ ).

## Discussion

When Grasshopper Warbler males arrive to the study area in late April and the beginning of May, the weather is often cold. The vegetation is not fully foliated and it is possible to see through a lot of the Salix bushes. This may result in Grasshopper Warblers searching for food closer to the ground, in ground cover and at the soil surface. Many of the insect types listed as food for Grasshopper Warblers are not found in any abundance in the study area until later in spring (personal observation during 35 years of monitoring the area). However, spiders (and ants) emerge earlier in spring than the other invertebrate groups listed as prey for Grasshopper Warblers. Thus, one reason for the higher

abundance of spiders in territories is that spiders could be an important food source for Grasshopper Warblers when they just have arrived to their territories in early spring.

However, it is also possible that the higher number of spiders within Grasshopper Warbler territories could indicate higher number of insects that is not possible to detect with the ground traps I used in this study. Further studies might shed more light on the subject.

## Sammanfattning

Under 2016 har en undersökning av marklevande evertetrater i och utanför gräshoppångarrevir genomförts. Studien genomfördes i Naturresevatet Björka lertag i Kumla, Närke. Syftet var att se om det var mer marklevande evertetrater i revir som hölls av sjungande hanar än på andra platser utan sjungande gräshoppångare i studieområdet. Undersökningen utfördes genom att 8 klisterfällor placerades på marken nära (inom 5 meter ifrån) sjungande hanar medan 12 andra klisterfällor placerades ut slumpmässigt i området (i genomsnitt 71 m från närmaste sjungande hane). Jag fann inga statistiskt säkerställda skillnader vad gäller det totala antalet fångade evertetrater, antalet myror, skalbaggar eller övriga evertetrater mellan besatta revir och andra plaster i undersökningsområdet. Däremot fann jag att det var signifikant fler fångade spindlar i besatta gräshoppångarrevir jämfört med de slumpmässigt utvalda platserna i studieområdet. Detta resultat kan tyda på att spindlar är en viktig födoresurs för gräshoppångare i studieområdet. Kanske är spindlarna speciellt viktiga tidigt på våren när andra evertetrater är ovanliga. Men det kan också vara så att spindlarna indikerar andra kvaliteter i gräshoppångarens revir.

## References

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