

Are migratory birds in the eastern Mediterranean affected by the distance of sea crossing in spring?



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Introductions

The Palearctic-African migration system comprises enormous numbers of birds travelling between Europe and Africa twice each year (Moreau 1972, Hahn et al 2009). Despite more than hundred years of bird migration studies, conclusive evidence on how birds cope with crossing ecological barriers has not been fully obtained.

Whereas the southward journey towards the wintering grounds has been subject to detailed investigations (cf. Bairlein 1985, Biebach et al 1986), data from spring migration, especially in the Eastern Mediterranean, are scarce (Yohannes et al. 2009). Body mass is a good predictor of fuel reserves (Biebach 1990) and it is an important indicator of the migration strategy used by different bird species. The Sahara desert and the Mediterranean Sea act as large ecological barriers and the eastern part include the largest distances for birds to cross. Data from this region is therefore necessary for a better understanding of how migratory birds manage to cross large inhospitable areas.



Figure 1. Study site on Antikythira.



Figure 2. Study site on Strofades.

Materials and Methods

This study deals with data on six migrant bird species from two small Greek islands, Antikythira (area of 20.4 km²) and Strofades (area of 4.0 km²; Fig. 1-3) trapped and ringed between 1st and 10th of May 2009.



Figure 3. Location of Antikythira and Strofades.

Both islands lie in the Ionian Sea with a distance of 390 and 490 km to the African coast in the south, respectively. The distance to the African coast in a southwest direction from Antikythira is 490 km while the same distance from Strofades is 770 km. On Antikythira the Hellenic Ornithological Society and the Hellenic Bird Ringing Centre run a bird observatory with ringing of migrants during spring and autumn.

Mist netting took place every day except of days with adverse weather conditions. On Antikythira sampling took place from dawn and eight hours while on Strofades from dawn to dusk. The study area consisted mainly of olive groves surrounded by low-maquis and scrubland type of habitats.

Discrepancies in sample sizes in the results are caused by missing measurements. When comparing the data between the two sites, parametric tests have been used when normality are met otherwise non-parametric tests have been applied.

Results

In total 195 Garden Warblers *Sylvia borin*, 41 Icterine Warblers *Hippolais icterina*, 75 Sedge Warblers *Acrocephalus schoenobaenus*, 73 Wood Warblers *Phylloscopus sibilatrix*, 78 Golden Orioles *Oriolus oriolus*, and 75 Spotted Flycatchers *Muscicapa striata* were trapped on Antikythira, while 227 Garden Warblers, 72 Icterine Warblers, 27 Sedge Warblers, 109 Wood Warblers, 33 Golden Orioles and 111 Spotted Flycatchers were trapped on Strofades. The mean wing lengths did not differ between the two study sites for all species (Table 1). On the contrary, the mean body masses were significantly different between the two sites in all species except for the Spotted Flycatcher (Fig. 2).

Table 1. Mean wing lengths on the two study sites and P value for differences between mean values.

Species	Wing length (mm)		P
	Antikythira	Strofades	
Garden Warbler	82.13±1.40, n=195	81.87±1.90, n=227	.12
Icterine Warbler	80.35±1.88, n=40	80.17±1.63, n=71	.59
Sedge Warbler	67.49±1.96, n=73	67.77±1.94, n=26	.57
Wood Warbler	74.66±2.24, n=72	75.05±2.12, n=108	.18
Golden Oriole	151.59±3.43, n=74	151.67±3.64, n=33	.91

Body masses found at both sites are below the average found in the Mediterranean during spring (Cramp 1992, Cramp & Perrins 1993) and mean body masses found on Strofades are exceptionally low, especially for Garden Warblers, Golden Orioles and Wood Warblers.

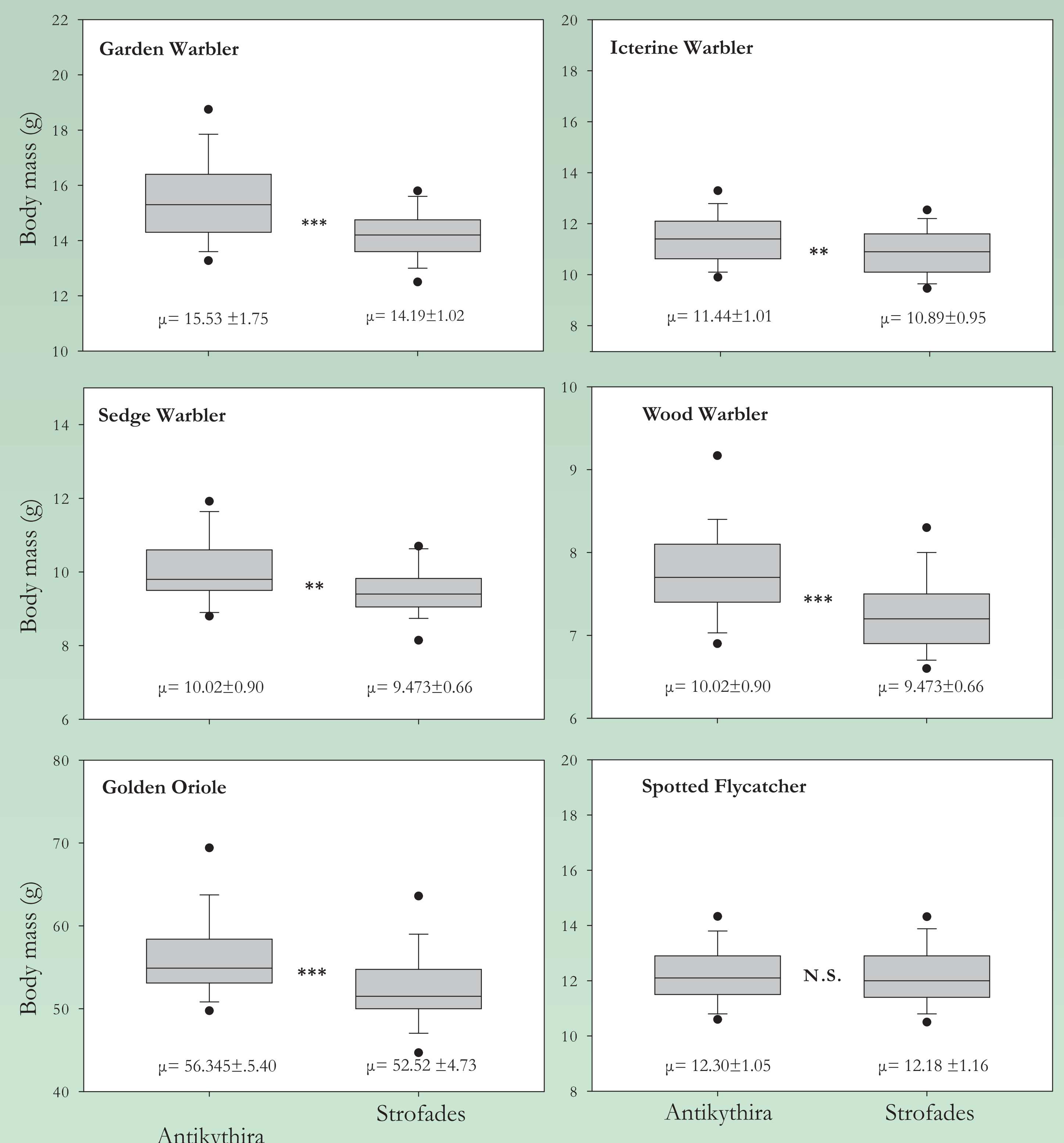


Fig 2. Mean body mass of the study species on Antikythira and Strofades. ***P<0.001; **P<0.01; N.S. not significant

Discussion - Conclusions

The low body masses found in all species at both study sites, compared with other Mediterranean sites, is probably a result of that a larger distance has to be covered in the east, including both the Sahara desert and the Mediterranean Sea, compared to the central and western parts.

The significantly lower body masses found in five out of six species studied on Strofades show that the distance of sea crossing is essential, even though small compared to the distance already covered over the Sahara desert.

The lack of a significant difference in the body mass of the Spotted flycatcher between the two sites is probably a result of the migration strategy followed by this species. In contrast to the rest of the species in this study the Spotted Flycatcher is the only species that regularly seems to stop and fuel in the Sahara desert during migration.

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