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JERICHO (PALESTINE) SPRING 2014 ORNITHOLOGICAL AND PARASITOLOGICAL RESEARCH RESULTS

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ABSTRACT

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Work begun in autumn 2013 at a research ringing site near Jericho in the Jordan Valley (Palestine) was continued in spring 2014 (8▯ March – 18▯ April). Due to a flood, the area was much changed in relation to the autumn habitat distribution. Standard ornithological and ringing work was performed using mist nets. The methods used were in accordance with SEEN (SE European Bird Migration Network) standards, and apart from ringing included some measurements (wing length, tail length, wing formula) and scores (fat determination and body mass), as well as testing of the directional preferences of migrants. The ornithological work was expanded to include parasitological testing, taking into account migrant-helminth relations during migration. Altogether 508 birds from 44 species were ringed and inspected for external signs of infection by *Collyriclum faba* trematodes (subcutaneous cysts), and an additional 32 dead individuals were collected and dissected. Altogether 168 internal parasites were found. The most common migrants in spring were Lesser Whitethroat *Sylvia curruca*, Blackcap *Sylvia atricapilla* and Olivaceous Warbler *Hippolais pallida*, while the autumn dominants – Masked and Red-backed shrikes (*Lanius nubicus* and *L. collurio*) were scarce. In spring a good number of Dead Sea Sparrows *Passer moabiticus* were caught, but only two introduced Indian Silverbills *Lonchura malabarica*.

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INTRODUCTION

Palestine is located in the western part of Asia between the continents of Europe and Africa, and therefore benefits from its significant geographic location with a wide range of temperature, rainfall, and topography. It is considered a bird migration bottleneck between Europe, Asia and Africa.

Jericho lies between Mt. Nebo in the east, the Central Mountains to the west, and the Dead Sea to the south. It is located in the Jordan Valley, which is part of the Great Rift Valley. In addition to these natural formations, Jericho has also benefited from natural irrigation afforded by the Jordan River to the east and from underground tributaries from the Central Mountains which feed the valley. This irrigation has resulted in abundant plant life in an otherwise barren desert. Jericho is the oldest city in the world and is estimated to be 10,000 years old. It is also known for being one of the lowest cities in the world, about 250 m below sea level. The land is primarily agricultural but is mixed with arid areas. The flora is characteristic for the Sudanian Penetration Region, where the winter is short and warm and the summer is long, hot, and dry. It is famous for its vegetables and palm trees.

Jericho's importance to the study of birds lies in its location in the Jordan Rift Valley, which is the second most important flyway for migratory birds in the world, according to Birdlife International. It is especially important for soaring birds and is the foremost route among Europe-Africa flyways.

STUDY AREA AND METHODS

The Environmental Education Center (EEC) operates two ringing stations in Palestine, one of which is the Jericho Ringing Station (31°51'N, 35°27'E). It is located in Jericho City, in the Jericho District, which lies in the Jordan Valley north of the Dead Sea and is characterized by an arid climate, but can also be considered an oasis due to its natural springs and availability of surface water.

The main study area is located in the southern part of the Wadi Qelt seasonal stream and also near Wadi Hajla and the adjacent wadi, 2 km to the north. In addition, the study area is located south of the main dump site for Jericho. This area is a rich oasis with a high abundance of plant life, including *Ziziphus spina-christi*, *Tamarix aphylla*, *Acacias*, *Atriplex lasiantha*, *Atriplex halimus* and *Datura innoxia* (Awad *et al*. 2013).

In the autumn of 2013 the vegetation was as described above and the valley was polluted by sewage water, but by the spring of 2014 the landscape had changed significantly. Few plants remained at the ringing site due to a snowstorm that hit the Middle East on 11th December, 2013. The storm led to vast flooding in the valley, which destroyed the vegetation but also replaced the sewage water with clean water (Fig. 1, compare to figure in Awad *et al*. 2013).

The EEC, in cooperation with SEEN (South-East European Bird Migration Network) and the Bird Migration Research Foundation in Przebendowo, continued the research project in Jericho that had begun in autumn 2013. This spring work was carried out from 8th March to 18th April 2014.

Fig. 1. Flood consequences in habitats of Wadi Quelt in spring 2014. Photo S. Awad. Compare Figure 2 in Awad *et al*. 2013 – a photo of the same location.

Basic ornithological work and ringing were carried out using 21 mist nets 12 m long and 25 mist nets 7 m long. These were distributed along the wadi. The procedures were in accordance with SEEN standards (Busse 2000), and included ringing and biometric measurements (wing length, tail length, wing-formula, fat scoring and weighting). Retraps were inspected for fat score and weighed. Additionally, for non-local birds tests for directional preferences were performed in Busse's orientation cage. Due to the very high daytime temperatures, the nets were closed at 11.00 a.m. local time and opened only after 4.00 p.m. They remained open during the night. During the day the nets were checked every hour, and more frequently in temperatures exceeding 35°C.

RESULTS OF THE ORNITHOLOGICAL ACTIVITY

During the research period 508 birds of 44 species were caught and ringed (Table 1), for a total of 952 birds of 72 species in both seasons. This is quite a wide variety of species. It is worth noting that while more individuals were caught in spring 2014 than in autumn 2013, the difference was smaller than we expected (Awad *et al.* 2013), despite the greater number of nets.

Table 1
List of species caught and ringed in Jericho in autumn 2013/spring 2014
(in autumn a few species were not ringed due to the lack of appropriate rings)

Code	Scientific name	English name	Autumn	Spring	Total
Caught and ringed					
ACR.ARU	*Acrocephalus arundinaceus*	Great Reed Warbler	1		**1**
ACR.SCH	*Acrocephalus schoenobaenus*	Sedge Warbler	9		**9**
ACR.SCI	*Acrocephalus scirpaceus*	Reed Warbler	9	8	**17**
ACR.RIS	*Acrocephalus palustris*	Marsh Warbler	5	1	**5**
ACT.HYP	*Actitis hypoleucos*	Common Sandpiper		1	**1**
ANT.TRI	*Anthus trivialis*	Tree Pipit	1	1	**2**
CAL.TEM	*Calidris temminckii*	Temminck's Stint	1		**1**
CER.GAL	*Cercotrichas galactotes*	Rufous Bush Robin	1	8	**9**
COT.COT	*Coturnix coturnix*	Quail		1	**1**
DEL.URB	*Delichon urbica*	House Martin		1	**1**
DEN.SYR	*Dendrocopos syriacus*	Syrian Woodpecker		1	**1**
EMB.CAE	*Emberiza caesia*	Cretzschmar's Bunting	5	1	**5**
EMB.HOR	*Emberiza hortulana*	Ortolan Bunting	1		**1**
ERI.RUB	*Erithacus rubecula*	Robin		2	**2**
GAL.CRI	*Galerida cristata*	Crested Lark	1	3	**4**
HAL.SMY	*Halcyon smyrnensis*	White. breasted Kingfisher		5	**5**
HIP.PAL	*Hippolais pallida*	Olivaceous Warbler	8	33	**41**
HIR.RUS	*Hirundo rustica*	Barn Swallow	2	6	**8**
JYN.TOR	*Jynx torquilla*	Wryneck	4	6	**10**
LAN.COL	*Lanius collurio*	Red-backed Shrike	24	1	**25**
LAN.NUB	*Lanius nubicus*	Masked Shrike	37	3	**40**

Code	Scientific name	English name	Autumn	Spring	Total
LOC.LUS	*Locustella luscinioiddes*	Savi's Warbler	5		**5**
LON.MAL	*Lonchura malabarica*	Indian Silverbill	46	2	**48**
LUS.LUS	*Luscinia luscinia*	Thrush Nightingale	2	1	**3**
LUS.MEG	*Luscinia megarhynchos*	Nightingale		4	**4**
LUS.SVE	*Luscinia svecica*	Bluethroat	10	14	**24**
MER.ORI	*Merops orientalis*	Green Bee-eater	8		**8**
MOT.ALB	*Motacilla alba*	Pied Wagtail		1	**1**
MOT.FLA	*Motacilla flava*	Yellow Wagtail	1		**1**
MUS.STR	*Muscicapa striata*	Spotted Flycatcher	5		**5**
OEN.CAP	*Oena capensis*	Namaqua Dove		1	**1**
OEN.HIS	*Oenanthe hispanica*	Black-eared Wheatear	2		**2**
OTU.SCO	*Otus scops*	Scops Owl	2	3	**5**
PAS.DOM	*Passer domesticus*	House Sparrow	5	25	**5**
PAS.HIS	*Passer hispaniolensis*	Spanish Sparrow	95	22	**117**
PAS.MOA	*Passer moabiticus*	Dead Sea Sparrow	16	55	**71**
PHO.PHO	*Phoenicurus phoenicurus*	Redstart	2	3	**5**
PHY.COL	*Phylloscopus collybita*	Chiffchaff	4	23	**27**
PHY.ORI	*Phylloscopus orientalis*	Eastern Bonelli's Warbler		10	**10**
PHY.LUS	*Phylloscopus trochilus*	Willow Warbler	43		**43**
PHY.SIB	*Phylloscopus sibilatrix*	Wood Warbler		1	**1**
PRI.GRA	*Prinia gracilis*	Graceful Prinia	1		**2**
PYC.XAN	*Pycnonotus xanthophygos*	Yellow-vented Bulbul	19	17	**46**
RAL.AQU	*Rallus aquaticus*	Water Rail	1		**1**
RIP.RIP	*Riparia riparia*	Sand Martin	1		**1**
SAX.OLA	*Saxicola rubicola*	Stonechat	1		**1**
SAX.TRA	*Saxicola rubetra*	Whinchat	3	1	**4**
STR.DEC	*Streptopelia decaocto*	Collared Dove		2	**2**
STR.DEC	*Streptopelia senegalensis*	Palm Dove		2	**2**
SYL.ALA	*Sylvia melanocephala*	Sardinian Warbler	2	1	**2**
SYL.ATR	*Sylvia atricapilla*	Blackcap	20	84	**105**
SYL.BOR	*Sylvia borin*	Garden Warbler	4		**4**
SYL.COM	*Sylvia communis*	Whitethroat	2	8	**10**
SYL.CUR	*Sylvia curruca*	Lesser Whitethroat	7	134	**140**
SYL.HOR	*Sylvia hortensis*	Orphean Warbler	1	7	**8**
SYL.RAX	*Sylvia melanothorax*	Cyprus Warbler		1	**1**
TRI.GLA	*Tringa glareola*	Wood Sandpiper	2		**2**
TRI.OCH	*Tringa ochropus*	Green Sandpiper	1		**1**
TUR.MER	*Turdus merula*	Blackbird		1	**1**
TUR.PHI	*Turdus philomelos*	Song Thrush		2	**2**
VAN.SPI	*Vanellus spinosus*	Spurn Lapwing	1	1	**2**
Total ringed			***421***	***508***	***929***
Caught and not ringed					
ALC.ATT	*Alcedo atthis*	European Kingfisher	9		**9**
ANA.CRE	*Anas crecca*	Teal	1		**1**
BUR.OED	*Burhinus oedicnemus*	Stone Curlew	1		**1**

Code	Scientific name	English name	Autumn	Spring	Total
EGR.GAR	*Egretta garzetta*	Little Egret	1		**1**
GAL.GAL	*Gallinago gallinago*	Snipe	1		**1**
HAL.SMY	*Halcyon smyrnensis*	White-throated Kingfisher	3	see above	**3**
LAN.EXC	*Lanius excubitor*	Great Grey Shrike	2		**1**
OEN.CAP	*Oena capensis*	Namaqua Dove	1	see above	**1**
ORI.ORI	*Oriolus oriolus*	Golden Oriole	1		**1**
POR.ANA	*Porzana porzana*	Spotted Crake	1		**1**
STR.TUR	*Streptopelia turtur*	Turtle Dove	1		**1**
TUR.SQU	*Turdoides squamiceps*	Arabian Babbler	1		**1**
Total not ringed			***23***		***23***
Grand total			**444**	**508**	**952**

Daily catches in Jericho fluctuated considerably from day to day (Fig. 2). It seems that the study period did not cover the entire period of autumn migration, as comparison with results at other stations in the region suggests that we started our study a bit too late in the season and also did not catch later migrants, such as most shrikes and late-migrating Sylvia warblers (and even later waves of the Blackcap – Fig. 3), flycatchers, and Willow Warbler (not one individual). Thus the spring work should be extended by about one month. The seasonal dynamics of migration of the two most numerous species are presented in Figure 3.

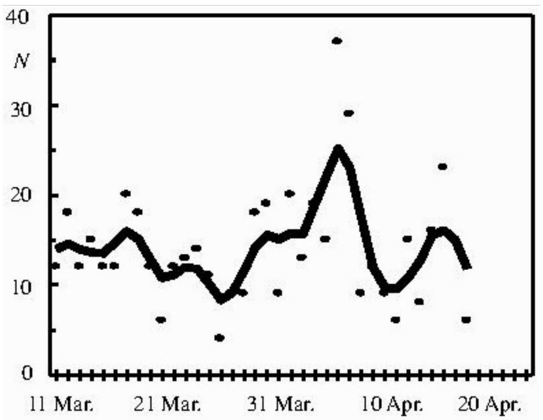

Fig. 2. Catching dynamics during the spring Jericho 2014 operation. Dots – daily catches, line – the daily data smoothed using a moving average.

The number of directional preference tests performed was quite good (233), considering the number of individuals caught and the limited time to work with due to the heat (the tests had to be stopped when the temperature reached 32–33°C). Hence more detailed analyses of individual species could be done for only two species: the Lesser Whitethroat and the Blackcap. However, it is interesting that the general patterns of headings of these species (Fig. 4 and 5), shown by the arrows, make sense, and agree

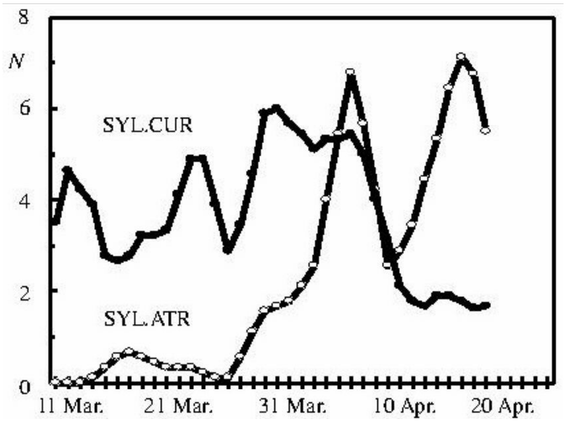

Fig. 3. Catching dynamics of dominant species: SYL.CUR – Lesser Whitethroat (*Sylvia curruca*), SYL.ATR – Blackcap (*Sylvia atricapilla*).

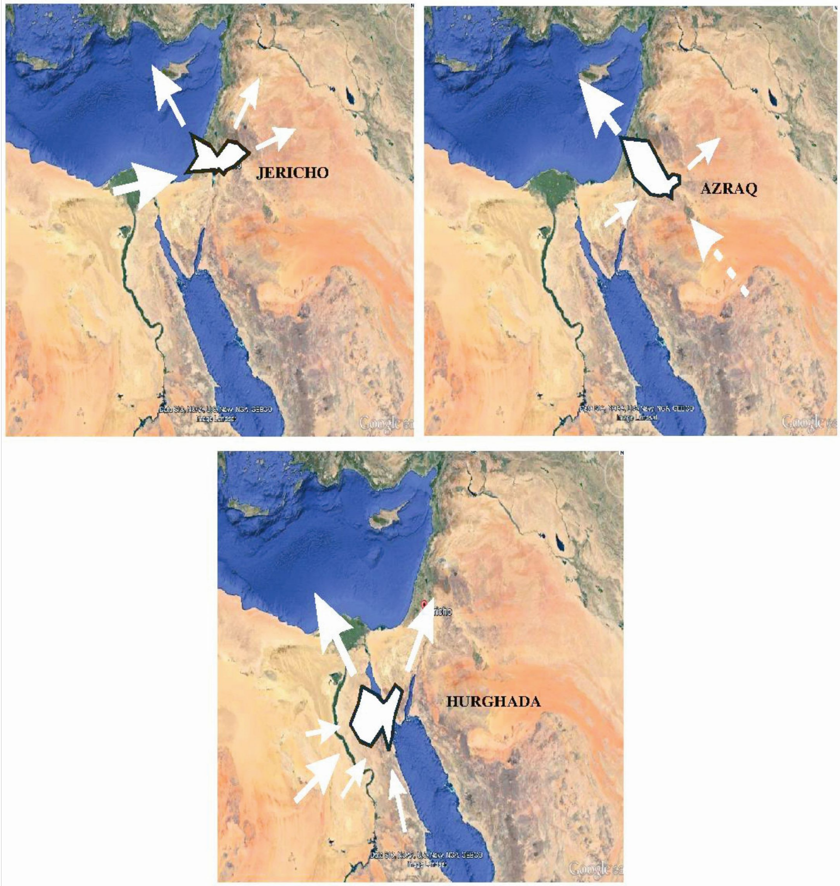

Fig. 4. General pattern of spring headings of the Lesser Whitethroat (*Sylvia curruca*) tested in the orientation cage (white areas), shown on a background map of the region. For comparison, patterns in Jericho (N = 78), Azraq, Jordan (N = 284) and Hurghada, Egypt (N = 56) are presented. Arrows illustrate assumed directions of migration.

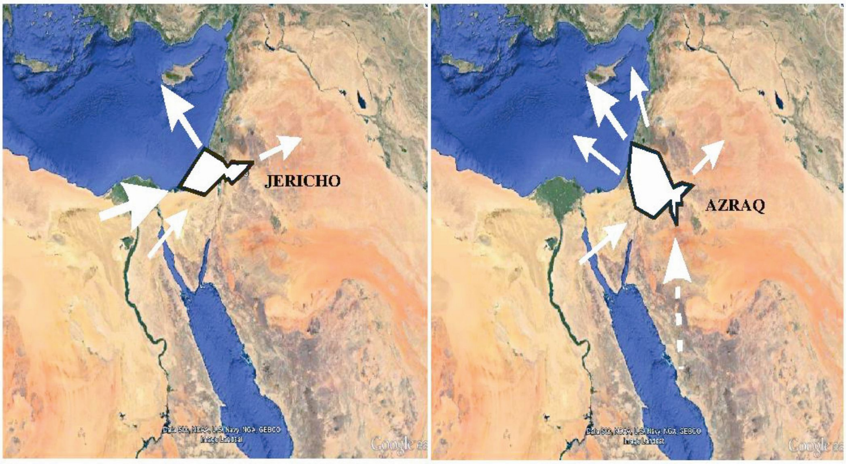

Fig. 5. General pattern of spring headings of the Blackcap (*Sylvia atricapilla*) tested in the orientation cage (white areas), shown on a background map of the region. For comparison, patterns in Jericho (N = 65) and in Azraq, Jordan (N = 141) are presented. Arrows illustrate assumed directions of migration.

exactly with results obtained in spring 2008 at Azraq, Jordan (Stępniewska *et al*. 2011) and in spring 2007 at Hurghada, Egypt (data supplied by P. Busse). It should be stressed that reverse headings (in southern sectors of the wind rose in spring) are much less pronounced than reverse headings in autumn (Ibrahim 2011, Awad *et al*. 2013,). The problem of reversed headings in any orientation cage results is well known (e.g. Formella and Busse 2002, Zehtindjiev *et al*. 2003, Stępniewski *et al*. 2011).

PARASITOLOGICAL PROBLEMS

Spring migration of birds along the eastern migration flyway is a good opportunity for parasites that pass their life cycle within sub-Saharan areas to move towards northern parts of the continent, as well as to Europe and Asia. Parasites can be transported by infected birds as eggs, larvae or mature animals. When they find suitable habitats and secondary hosts along the flyway or on breeding grounds they can invade new areas to inhabit permanently and become new members of parasitic fauna far from their places of origin. Parasitological studies on helminths in Africa and along the flyway are rare, and knowledge of such transfers to Europe and Poland is very scarce. Okulewicz J. (1993) described infections of the Yellow Wagtail *Motacilla flava* in Poland with the flatworm *Mosesia pavlovski*, which could have been transferred from its winter quarters in Africa.

In spring 2012 we studied internal parasites in Azraq, Jordan, in autumn 2012 at Wadi Allaqi, Egypt, and in autumn 2013 at Jericho and Thalitha Kumi, Palestine (Awad *et al*. 2013). The goal of these studies was to describe helminth assemblages in long-distance migrants among passerines as well as to follow connections between helminths transported by migrants and local parasite fauna of sedentary birds living along the migration route. The study conducted this season was a continuation of this research. Obtaining sufficiently rich data by collecting carcasses for dissection on the basis of accidental deaths of birds caught for ringing and/or occasionally encountered hunted individuals is a difficult task (Hromada *et al*. 2000, Okulewicz A. and Okulewicz J. 2006, Kalisinska *et al*. 2008, Rząd *et al*. 2014, Sitko and Zalesny 2014). The only chance of collecting a sufficiently vast amount of data during ornithological activity is to check all birds caught for external symptoms of infection by helminths, which is possible in the case of the digenean (flatworm) species *Collyriclum faba*. This possibility is fully exploited in our work and resulted in the first finding of this species in Africa in the Willow Warbler Phylloscopus trochilus – a long-distance migrant from Europe to the southern part of Africa (Rząd and Busse 2014). During our current work in the spring in Jericho we examined 508 live birds for the presence of this parasite. These birds belonged to 35 passerine species and 8 non-passerine species. We checked the head, the upper part of the body around the coccygeal gland, the underparts of the body, the underwings and the legs. Not one parasite was found.

Altogether 32 dead individuals were dissected, representing 9 migrant and local species. The carcasses were dissected and parasites preserved using standard parasitological methods. Detailed studies on helminth species identification are the subject of current laboratory work.

Helminths were found in carcasses of 2 migrant species (tapeworms and roundworms in the Barn Swallow and flatworms, tapeworms and roundworms in the Blackcap) and in 3 species of local birds (the Dead Sea Sparrow – tapeworms and huckworms, the Yellow-vented Bulbul – roundworms, and the Palm Dove – tapeworms). They are listed in Table 2. In total 7 flatworms, over 30 tapeworms and 92 roundworms were collected from migrants, and 26 tapeworms and 7 huckworms from local birds. The results suggest that in future special interest should be focused on the high level of infection of Blackcaps by roundworms and on the high prevalence of infection of the Barn Swallow by tapeworms and roundworms. These are both long-distance migrants.

Table 2
Helminths found in dissected birds in spring 2014 at Jericho, Palestine

Bird species	Number of dissected birds	Number of infected birds	Number of birds infected by particular groups of helminths			
			Digenea	*Cestoda*	*Nematoda*	*Acanthocephala*
Migrants						
Hirundo daurica	1	-	-	-	-	-
Hirundo rustica	7	7	-	7	4	-
Luscinia megarhynchos	1	-	-	-	-	-
Sylvia atricapilla	14	7	1	1	6	-
Sylvia curruca	1	-	-	-	-	-
Phylloscopus collybita	2	-	-	-	-	-
Local species						
Passer moabiticus	3	2	-	1	-	2
Pycnonotus xantophygos	2	1	-	-	1	-
Streptopelia senegalensis	1	1	-	1	-	-

Parasites can influence the physical condition of individuals in migrating populations of birds, and thus they may be an important element of selection pressure on migrants. Especially during the extreme challenge of crossing large barriers birds are at great risk, which can frequently cause the animal to be eliminated from the population (Fig. 6). The death of the host normally entails the death of the parasite, so research on this balance is crucial for understanding changes in biodiversity and the population dynamics of both hosts and parasites. The work carried out to this point suggests that the most feasible and promising research will be further studies on the parasite fauna of such migrants as the Reed Warbler, swallows – the Barn Swallow and the Red-rumped Swallow, the Nightingale, the Blackcap, the Lesser Whitethroat and the Chiffchaff.

Fig. 6. A young Masked Shrike (*Lanius nubicus*) that died from exhaustion during flight in a desert near Assuan, Egypt. Photo P. Busse

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