



Status and conservation of European Roller (*Coracias garrulus*) in Israel



Photo by Moshe Cohen

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This report was prepared by Society for the Protection of Nature in Israel (SPNI, BirdLife partner in Israel) as part of the cooperative action with MME/ Birdlife Hungary towards the realisation of research actions under the LIFE+ project LIFE13/NAT/HU/000081 “Conservation of the European Roller (*Coracias garrulus*) in the Carpathian Basin” (hereinafter: ROLLERLIFE project). The research is a joint effort of ROLLERLIFE project and SPNI, with a total duration from June 2015 to June 2018.

Under the terms of a relevant agreement between MME and SPNI (signed in February 2015) the specific tasks for SPNI for the period 2015-2018, were as follows:

- (1) Localize and survey of migratory hotspots of migrating European rollers from 2015 to 2017.
- (2) Identify threats of migratory hotspots in a technical document in English with a summary also in English by 31.06.2018.
- (3) Raise public awareness and organize in situ actions, if required.

Acknowledgments

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Background

The European Roller (*Coracias garrulus*) is a rather common migrant throughout the country, and breeding summer-visitor to Mediterranean region and semi-desert. It migrates through Israel both in spring (April – May) and autumn (August – October). It can be seen on migration throughout the country, but concentrations are seen mainly in productive valleys and plains – Hula Valley, Golan Heights, Bet She'an Valley, Jordan Valley, Judean Plains and Arava Valley (Figure 1). It migrates through Israel mainly in small numbers, but occasionally concentrations of up to 10 are seen in one locality (Shirihai, 1996, this study).

Recently, the conservation status of European Roller in Israel has been evaluated for the update of the Red List of Birds in Israel (Mayrose *et al.*, 2017). The European Roller is now classified as VU in Israel, due to a decline of over 10% over 3 generations (16.8 years).

Originally, this study intended to focus on stop-over sites of European Rollers in Israel, identified by satellite-tracking of Hungarian-breeding birds. None of the Hungarian-tagged birds stopped-over or even flew over Israel. Therefore, an alternative plan was agreed with MME that included:

- 1) Identification of stop-over hotspots of European Roller in Israel using all available data.
- 2) Analysis of main threats to those hotspots.
- 3) Evaluation of the status and conservation of breeding European rollers in Israel.

For this report, data on observations of European Rollers in Israel were obtained from the main data source at birds.org.il. These observations were analysed temporally and spatially. Additionally, ringing recovery data were obtained from Israel Bird Ringing Center. Information about conservation risks obtained from Conservation Department at SPNI.

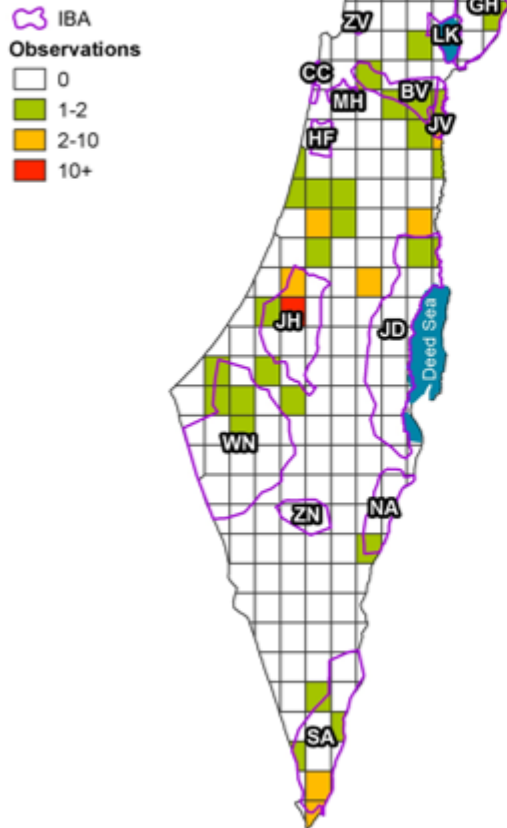
Results

Conservation status of the migratory population through Israel

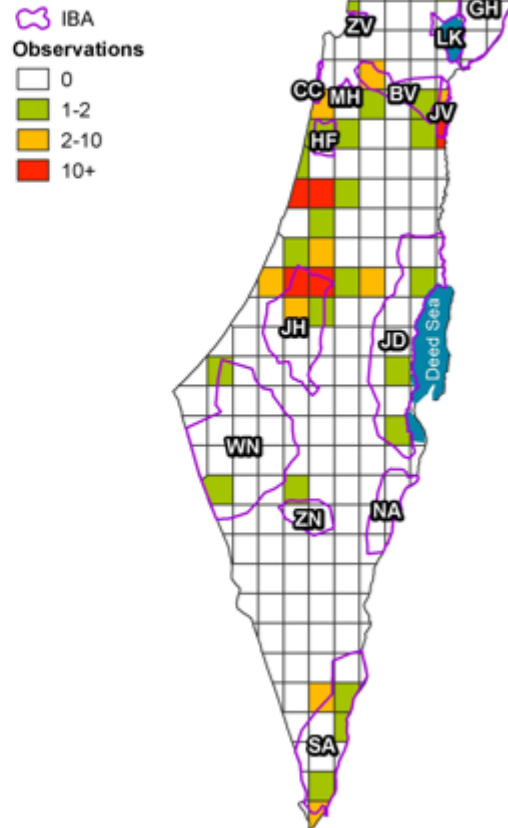
Origins of European Rollers migrating through Israel are not completely clear. There are only two ringing recoveries. An individual ringed in Latvia 57°17'N / 26°34'E in July 1937 was found near Jerusalem in May 1938. An individual ringed near Hazeva in the Northern Arava in April 1992 was found in June 1996 near Kiskoros in Hungary 46°38'N / 19°17'E. No satellite-tracked rollers were found to pass through Israel. It is unknown where in Africa birds that migrate through Israel spend the winter.

On spring migration (April-May), stop-over hotspots are in the Judean Foothills, Eastern Dan Region, Jordan Valley and southern Arava Valley, with lesser concentrations in Hula Valley and Golan heights, Bet She'an Valley and northern Negev (Figure 1A). On autumn migration (August – October), stop-over hotspots are in Hula Valley and Bet She'an and Jordan Valleys, and Judean Foothills (Figure 1B). It is difficult to estimate numbers and trends. Shirihai (1996) reported a dramatic decrease in daily maximum counts, especially in the Southern Arava, from thousands in the 1960's and 1970's to fewer than 100 in the 1980's. Since then, it is possible that numbers may have dropped even further. The mean count in checklists submitted to birds.org.il 2014-2017 (2018 in spring) was 2.24 (SD=2.83, max=20) in spring, and in autumn 3.05 (SD=3.30, max=18). Histogram of counts per checklist are in Figures 2A (spring) and 2B (autumn). Between 2014 and 2017 (2018 in spring), no significant changes have been detected in mean and maximum counts. Mean and maximum counts 2013-2017/18 are presented in Figure 3A (spring) and 3B (autumn).

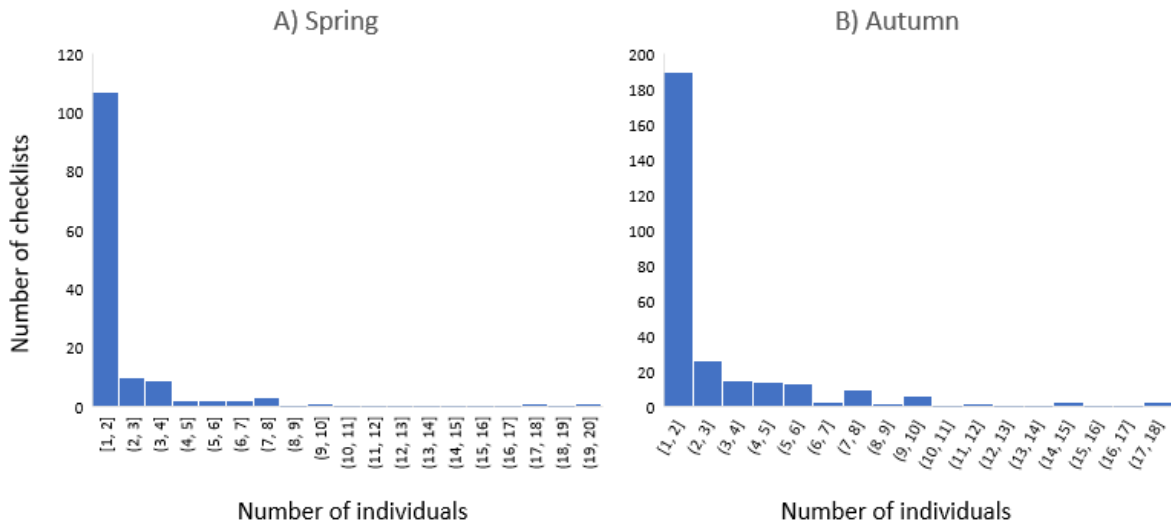
A) Spring



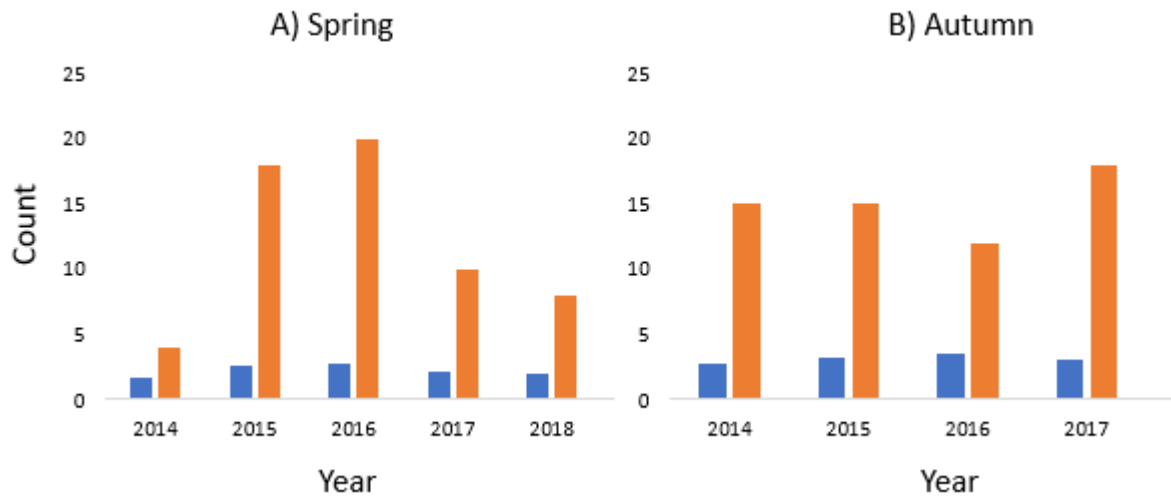
B) Autumn



Figures 1A and 1B: Spatial distribution of observations of European Roller (*Coracias garrulus*) in Israel, A) in spring (April-May) and B) in autumn (August – October). Distribution expressed as number of checklists containing this species uploaded to birds.org.il 2014-2017. Purple-outlined polygons are IBAs, retrieved from <http://datazone.birdlife.org/country/israel/ibas>. IBA abbreviations: HR – Mt. Hermon; HV – Hula Valley; GH – Golan Heights; LK – Lake Kinneret; ZV – Zvulun Valley; BV – Bet She’an, Jizreel and Harod Valleys; JV – Jordan Valley; MH – Menashe Hills; CC – Carmel Coast; HF – Hefer Valley; JH – Judean Foothills; JD – Judean Desert; WN – Western Negev; ZN – Zin Cliffs and Negev Mts.; NA – Northern Arava; SA – Southern Arava.



Figures 2A and 2B: Histograms of number of European Rollers (*Coracias garrulus*) counted in checklists submitted to birds.org.il between 2013-2017, in spring (A, April – May) and autumn (B, August – October).



Figures 3A and 3B: Mean (blue) and maximum (orange) counts of European Rollers (*Coracias garrulus*) in checklists submitted to birds.org.il between 2013-2017/18, in spring (A, April – May) and autumn (B, August – October).

Characterisation and risks of hotspots for migratory European Rollers in Israel

Most of the hotspots identified are within IBAs (Table 1). All these regions are characterised by open farmland: either non-irrigated farmland, with cereals, legumes and pastoral cultivation, or irrigated farmland with different vegetables, fruit trees and plantations. Risks to hotspots include mainly intensification of open agriculture into perennial agriculture and plantations, suburban and urban development and other types of development. Risks per hotspot are in Table 1.

Table 1: Risks to European Roller (*Coracias garrulus*) hotspots during migration in Israel.

Hotspot	Within IBA	Landscape characteristics	Risks
<i>Hula Valley</i>	<i>Hula Valley</i>	<i>Legumes, cereals, corn</i>	<i>Development, intensification</i>
<i>Bet She'an Valley</i>	<i>Bet She'an, Jizreel and Harod valleys</i>	<i>Legumes, cereals, corn, date plantations</i>	<i>Development, intensification, urbanisation</i>
<i>Golan Heights</i>	<i>Golan Heights</i>	<i>Pastoral system</i>	<i>Intensification, development</i>
<i>Dan Region</i>		<i>Suburban, cereals, citrus</i>	<i>Urbanisation</i>
<i>Judean Foothills</i>	<i>Judean Foothills</i>	<i>Legumes, cereals, corn, citrus</i>	<i>Development, intensification, urbanisation</i>
<i>Northern Negev</i>	<i>Western Negev</i>	<i>Cereals, vegetables, citrus</i>	<i>Intensification</i>
<i>Jordan Valley</i>	<i>Jordan Valley (partial)</i>	<i>Rangelands, date plantations</i>	<i>Development, intensification</i>
<i>Southern Arava</i>	<i>Southern Arava</i>	<i>Irrigated vegetables, date plantations</i>	<i>Industrialisation</i>

Conservation status of the breeding population in Israel

In Israel, the European Roller breeds in valleys and plains in the Mediterranean and semi-desert zones. It breeds in sand banks, often in old sand quarries and along canals and dry rived beds. Overall, the conservation status of the breeding population of European Roller in Israel is decreasing. In 2017 the current status was updated in the new Red Book (Mayrose *et al.*, 2017). It is now officially classified as VU, due to a rapid decline in population numbers of over 10% during 3 generations (16.8 years). In the previous Red Book evaluation in 2002 it was classified as NT (Alon & Mayrose, 2003). Overall, there were national decreases both in densities and occupancy of breeding populations between 1980-1990 and 2010-2020. In the 1980's, the national breeding population was estimated at 500-1000 pairs. Currently no more than 500 pairs breed in Israel, with marked decreases in large parts of the Galilee, Carmel, Judean and Coastal Plains. Densities are in Figure 4, while changes in densities and occupancies are in Figure 5. Main threats to the breeding population are poisoning in cultivated areas, habitat loss and degradation including afforestation in rangelands and semi-deserts, and disturbance in breeding sites (Mayrose *et al.*, 2017).

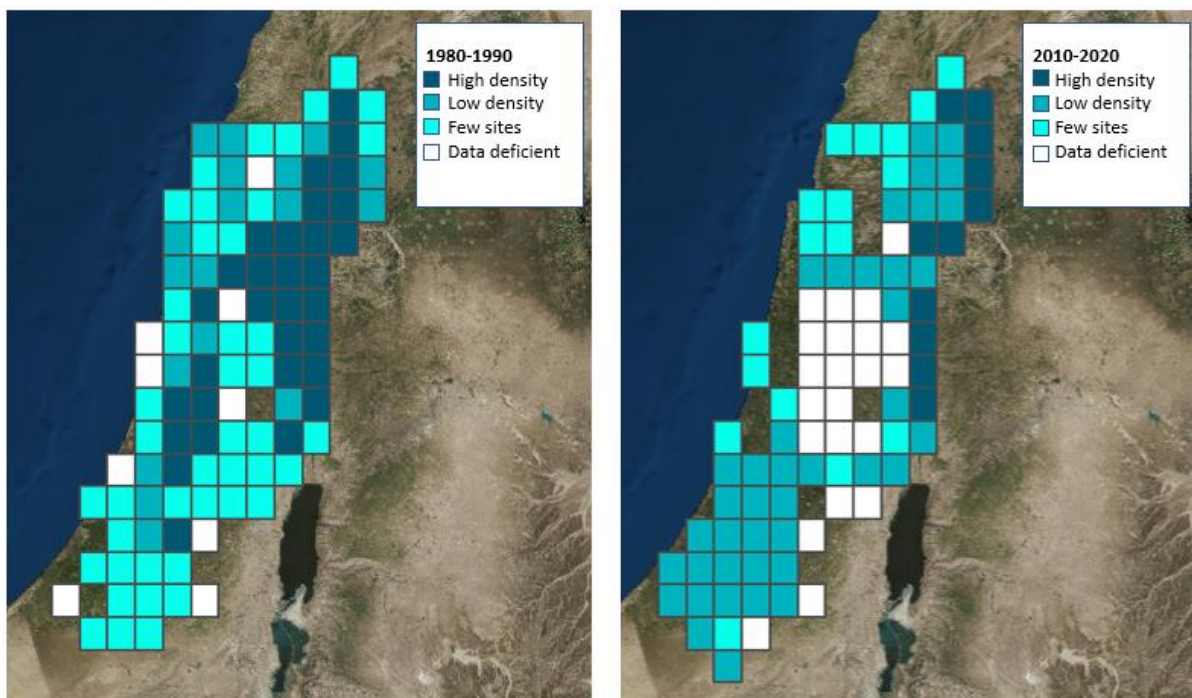


Figure 4: Densities of European Rollers (*Coracias garrulus*) breeding in Israel in 1980-1990 (left) and 2010-2020 (right). Downloaded from <https://staging.species-parks.initech.co.il/birds/%D7%9B%D7%97%D7%9C/>.

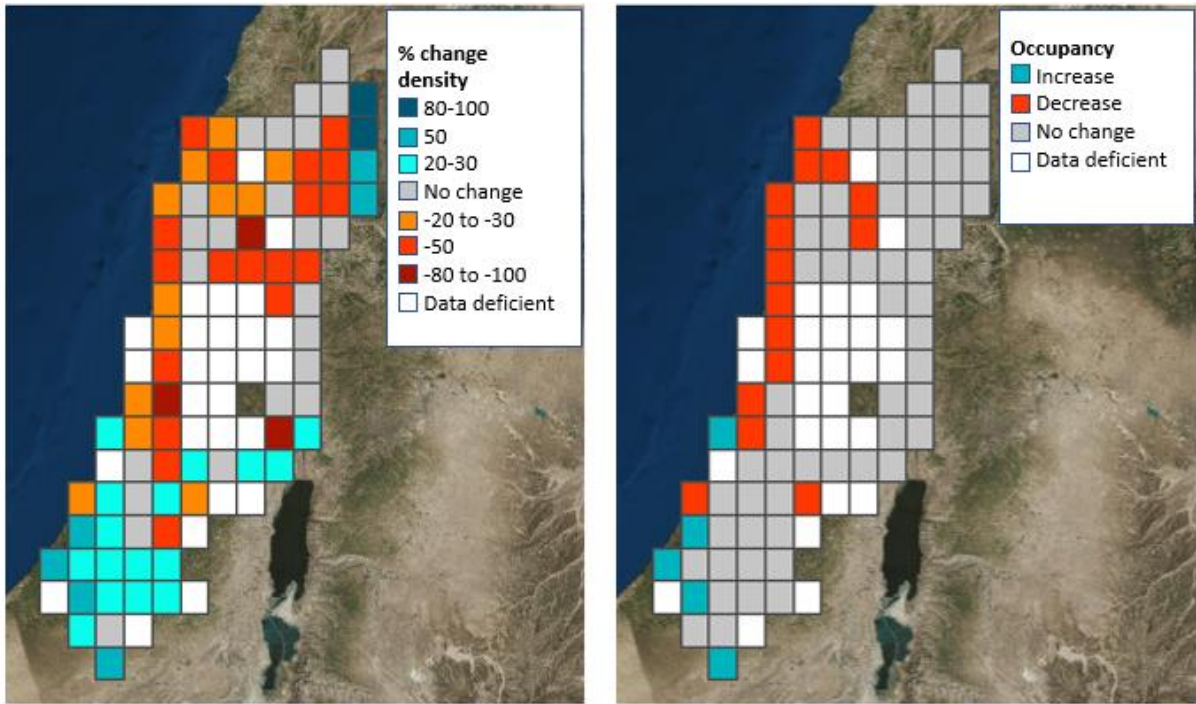


Figure 5: Changes in densities (left) and occupancies (right) of European Rollers (*Coracias garrulus*) breeding in Israel. Downloaded from <https://staging.species-parks.initech.co.il/birds/%D7%9B%D7%97%D7%9C/>.

Discussion

Overall, both the migratory and breeding populations of European Roller in Israel are decreasing. It must be stressed that the data used for these evaluations is of some uncertainty. It is recorded in rather low frequencies in checklists submitted to birds.org.il. Therefore, inference from checklists submitted about mean and maximum counts must be done with caution. Similarly, evaluation of the status of the breeding population to establish its VU classification was based mainly on systematic expert evaluations and less on hard data (Mayrose *et al.*, 2017). Confidence in the data used to evaluate the status in Israel needs to be improved, by accumulation of more birders data and targeted censuses of breeding populations.

Nevertheless, conservation action is needed to protect both migrant and breeding populations in Israel. While most migration hotspots are located within IBAs, these IBAs offer little legislative protection for the open, low-intensity habitats required by rollers in Israel. Similarly, many rollers breed in unprotected sites. Using the current data and hopefully high-quality data obtained in the near future, targeted conservation should be addressed, including protection of breeding habitats and hotspots, reduction of the use of pesticides, and better protection against disturbance in breeding sites.

Little is known about the vulnerability of European Roller to wind turbines and to collision with powerlines. In Spain, nest-boxes are often placed along electric powerlines (Avilés *et al.*, 2000) but no information is provided about collisions or electrocutions. This aspect needs to be studied urgently, as several large new wind energy projects are in the planning process, including in hotspots for migration and breeding such as Golan Heights, Bet She'an Valley and Southern Arava.

Currently, nest-boxes are not used in Israel for rollers, despite considerable success such projects have had in Europe to increase breeding success (Catry *et al.*, 2009; Kiss *et al.*, 2016; Rodríguez *et al.*, 2011). The use of nest-boxes in Israel to increase numbers of breeding pairs should be considered.

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