Opportunistic in-flight foraging behaviour of Black Kites Milvus migrans during spring migration through the Batumi bottleneck, Georgia

Article · October 2021

CITATIONS
0

READS
41

3 authors, including:

Tohar Tal
University of Groningen
1 PUBLICATION **0** CITATIONS
SEE PROFILE

Wouter M.G. Vansteelant
Estación Biológica de Doñana
35 PUBLICATIONS **428** CITATIONS
SEE PROFILE

Opportunistic in-flight foraging behaviour of Black Kites *Milvus migrans* during spring migration through the Batumi bottleneck, Georgia

TOHAR TAL, DIEGO JANSEN & WOUTER MG VANSTEELANT

Summary: In 2019 and 2020 the Batumi Raptor Count conducted two small-scale pilot counts to assess the importance of the flyway in spring. We present preliminary results for Black Kite *Milvus migrans*, showing that this species is more numerous in spring than in autumn and that it engages in in-flight foraging while passing through the Batumi bottleneck, a behaviour that has never been observed in twelve years of autumn counts. In-flight foraging appears to be largely opportunistic, occurring during only a short period of the Black Kite migration season and involving a minority of individuals. As such, in-flight foraging opportunities are unlikely to be the main cause of the greater spring aggregation of Black Kites in the eastern Black Sea flyway.

INTRODUCTION

The Batumi Raptor Count (BRC) has conducted standardized autumn counts along the eastern Black Sea flyway for 12 consecutive years (Verhelst *et al* 2011, Vansteelant *et al* 2020), but little is known about spring raptor migration. In 2019 the BRC therefore decided to conduct three years of full-season spring counts to quantify the abundance and timing of spring migrants in the Batumi bottleneck for the first time. So far two count seasons have been completed by teams of two to five volunteers from a single count station in the village of Sakhalvasho, Georgia (Figure 1). Our preliminary results already reveal seasonal differences in the abundance and migration behaviour of certain species passing through the Batumi bottleneck, in particular the Black Kite *Milvus migrans*.

Figure 1. Counting site seen from the south, with the Black Sea (left) and the Lesser Caucasus mountains (right). (source: Google Maps)

The flight behaviour of Black Kites can be seen as intermediate between the behaviour of obligate-soaring broad-winged raptors, such as eagles and vultures, and the facultative soaring strategy of relatively narrow-winged raptors, such as species in the genus *Circus* (Spaar 1997, Horvitz *et al* 2014). Black Kites tend to fly over land, concentrating at straits and isthmuses, using thermals to minimize energetic costs (Santos *et al* 2020). However, they are also capable of extended periods of flapping flight, including long flights over sea (Literak *et al* 2020). Thus while heavy cloud cover over the Lesser Caucasus mountains typically pushes soaring raptors towards the coast in autumn, Black Kites do not show a strong increase in coastal aggregation in response to such circumstances (Panuccio *et al* 2014, Vansteelant *et al* 2014). At Batumi, Black Kites also tend to fly independently from other raptors, forming their own streams and continuing to travel even through adverse weather conditions (Hoekstra *et al* 2020).

Black Kite has several subspecies across its Palearctic breeding range, and intergrades between them. The ranges of these different forms are not well defined, partly due to difficulty of identifying different subspecies in the field. However, Black Kites passing through Georgia are likely to contain both pure *M. m. migrans* from NE Europe, so-called Black-eared Kites (subspecies *lineatus*) from Central Siberia, and potentially many intergrades of *M. m. migrans* with *M. m. lineatus* from West Russia (Forsman 2016, Karyakin 2017, Lazaro 2021). While the nominate *migrans* subspecies migrates long distances to sub-Saharan Africa, we know there is strong connectivity between Georgia and growing wintering populations of Black Kites in the Middle-East (Vansteelant *et al* 2020 and Daniel Berkowic, unpubl data), which are thought to consist mostly of *lineatus* (or intermediate forms between *migrans* and *lineatus*; Lazaro 2021). Tracking studies indicate that different subspecies of Black Kite from the western as well as the eastern Palearctic engage in relatively fast migrations, making only few and short stop-overs (Sergio *et al* 2014, Kumar *et al* 2020). However, the passage of multiple subspecies with distinct migration strategies is likely to be one of the main reasons why Black Kites show a much later and also much longer autumn migration period at Batumi than Black Kites in the West European flyway (Panuccio *et al* 2014, Vansteelant *et al* 2020), which consist solely of the trans-Saharan migrant *migrans* subspecies.

METHODS

The pilot spring counts are a small-scale version of the autumn counts, essentially using the same peer-reviewed count and data recording protocol (Wehrmann *et al* 2019), except that we used only one count site (Sakhalvasho, 41.6826 N, 41.729 E) with two to five observers in 2019 and one to five in 2020. In addition, we did not continue to count during periods of inclement weather in spring, and due to Covid-19 regulations the 2020 count was partially conducted (one week) from the garden of the volunteers' lodge, which offers reduced but adequate visibility compared to the actual count site. Counts were conducted from 21 March to 31 May in 2019, and, because we found that substantial numbers of raptors were already passing at the start of that period, counts were conducted from 1 March to 25 May in 2020.

RESULTS

Season totals and timing

While Black Kites are the third most abundant raptor passing through Batumi in autumn, they are the second most abundant raptor during both of the spring counts conducted so far (Tal & Jansen 2019, Vansteelant *et al* 2020). The spring counts of 2019-2020 recorded on average 241 000 individuals, while in autumn, the average number of Black Kites counted between 2011 and 2018 was 137 000 (+/- 36 000) individuals. As Black Kites have

consistently increased in abundance by around 10% per year between 2011 and 2018 (Vansteelant *et al* 2020), our recent spring counts are best compared to their immediately preceding autumn counts in Batumi. In doing so (Table 1), we find that the spring counts of 2019-2020 were consistently higher than the autumn counts of 2018-2019, which were among the highest autumn totals ever recorded in Batumi. The trans-Caucasian passage of Black Kites thus appears to be greater or more concentrated along the eastern Black Sea coast during spring compared to autumn migration. The highest daily counts of Black Kite were recorded on 1 April in 2020 (47 405 individuals) and on 5 April in 2019 (41 457 individuals). To our knowledge, these are the highest day counts for Black Kites recorded in the eastern African-Palearctic flyway (Porter & Beaman 1985, Shirihai & Christie 1992, Shirihai *et al* 2000, Üner *et al* 2010).

Flight paths

During the 2019 spring count, a clear preference for a flight path was observed with 76% of the Black Kites flying to the west of our count station, and 20% of Black Kites were recorded at or off the Black Sea coast (Table 1). In 2020, streams of kites were more often observed to migrate directly over the count site or even to follow more inland routes, but 63% of the birds still followed the westerly flight paths, and 6.8% of the kites flew over or off the Black Sea coast. This is much more than the number of kites seen flying over the shore or over the sea in autumn (0.2-0.6%; Table 1). Kites flying over the sea did so in active flapping flight, and were not seen circle-soaring directly over water, while kites frequently engaged in thermal soaring over land.

Table 1. Raw season totals (uncorrected for unidentified medium-sized raptors) of Black Kite *Milvus migrans* at Batumi Raptor Count, along with the number and proportion recorded over or off the Black Sea coast, approximately 2 km from count station 1 in Sakhalvasho.

Season	Year	Total count	Total over or off coast	% over or off coast
Autumn	2018	149 077	232	0.2
	2019	221 647	1 425	0.6
Spring	2019	224 108	44 308	19.8
	2020	257 155	17 603	6.8

In-flight foraging

In spring 2020 a Black Kite carrying a mole *Talpa* sp was seen passing our counting station (Plate 1), which was considered to be unusual. Furthermore, during the first spring count in 2019 we also observed Black Kites foraging in flight on insects (Plate 2). This behaviour had never been observed in twelve years of BRC autumn counts.

The method of hunting was the same on each occasion; the individual was part of a flock of Black Kites when, all of a sudden, it broke away from the stream and took a sharp turn (up, down or to the side). While it swooped, it reached out with its talons and caught an insect. After a successful catch, the insect was consumed mid-air, resembling the behaviour of small falcons (Plate 2). As the insects were relatively small, consumption did not take much time and the individual soon continued migrating along with the others. Both immature and mature birds engaged in such aerial hunting behaviour.

This behaviour seemed to be time-specific and was observed for the first time on 11 April in 2019. Even though Black Kite migration was still in full swing during this period, it is just after the peak migration period for this species in Batumi (Figure 2). It was recorded again on 13 April and was possibly seen a few more times in the following days.

Plate 1. Black Kite *Milvus migrans* carrying a mole *Talpa* sp, 8 March 2020. © *Tohar Tal*

Plate 2. Black Kite *Milvus migrans* consuming an insect, 13 April 2019. © *Diego Jansen*

During 2020 we paid close attention to this type of in-flight behaviour and hunting was observed again in the same period. This time it started on 13 April and continued for five more days. On all these days, Black Kites would only start hunting around 15:00 until late in the afternoon and/or when migration ceased. The hunting mostly occurred overhead or to the east of our count station. In 2019 hunting mainly occurred 2.4-3.6 km inland from the coastline. In 2020, with the kites, the hunting shifted more eastwards, to 3.2-4.8 km inland from the coast and thus 0.8 to 1.6 km away from the count station.

On 13 April 2020 we observed 32 Black Kites, out of a total of 2172 recorded after 15:00, displaying insect-catching behaviour. This was one of five days on which the behaviour was observed. The conditions of group association were similar on all occasions. Flocks of approximately 50-200 Black Kites would come through as a stream. From the stream one or a few individuals would swing away, make foraging movements, and re-join the stream to continue migration. In most cases we were able to tell whether the hunting was successful or not, as the kites would instantly consume the insect caught. Unfortunately due to the lack of notes we cannot quantify their success rate.

Furthermore, and frustratingly, due to the small size of the insect prey we were unable to see it properly (not even with the help of our binoculars, scope and cameras) and thus we could not determine the species (Plate 2). The small size does, however, exclude any large insect such as dragonflies, large beetles or Orthoptera (grasshoppers, crickets or locusts). On the other hand, very small insects, such as small flies (Diptera), are unlikely to be large enough for Black Kites. Moreover, timing excludes large robber-flies since they do not appear in early April. As it happened relatively near the Black Sea coast, the species preyed upon were likely to be stoneflies (Plecoptera) or mayflies (Ephemeroptera) (Gabelashvili *et al* 2017, Armen Seropian pers comm).

DISCUSSION

Though we only report two years of data, we believe the higher spring counts reflect a real seasonal pattern, especially considering that we worked with fewer observers

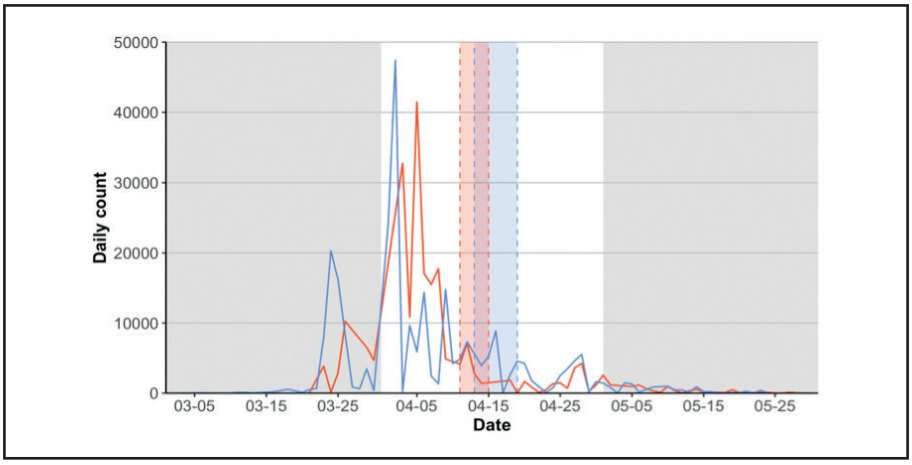

Figure 2. Daily counts of Black Kites during spring 2019 (red) and 2020 (blue). Grey/white shading indicate months (March - April - May). Red/blue shading and dashed lines indicate periods during which in-flight foraging was observed in each year.

and from just one site in spring. Our observations show that in-flight foraging during migration occurs regularly among Black Kites passing through the Batumi bottleneck during the second and third week of April. Although in-flight foraging on insects is a well-known behaviour of this highly opportunistic feeder, Black Kites have never been observed to engage in such behaviour during twelve years of autumn counts (2008-2019), despite several hundred thousand individuals being observed each year. In fact, autumn observations of in-flight foraging by migrant raptors at Batumi are mostly restricted to small falcons (Hobby *Falco subbuteo*, Red-footed Falcon *Falco vespertinus*) hunting dragonflies and other insects, *Accipiter* and *Circus* species hunting small passerines, and Ospreys *Pandion haliaetus* carrying fish during passage on multiple occasions.

It may be tempting to deduce that the availability of insect prey is one of the reasons why kites aggregate in greater numbers through the Batumi bottleneck in spring than in autumn. However, it is unclear how much energy kites could gain by foraging on such small prey species. Black Kites that foraged during passage seemed to do so opportunistically, without losing much time and re-joining their flock within seconds to minutes. In contrast, Black Kites are known to interrupt migration to opportunistically forage on locusts and termites in years when they encounter such large and rewarding prey (Panuccio *et al* 2014). Moreover, our observations concern a minority of dozens of individuals out of a few hundred thousand birds, including both immature and adult kites. As such, the seasonal migration pattern of Black Kites in Batumi does not seem to be related to local foraging opportunities.

The reason for the higher spring aggregation may be due to larger numbers of birds using the trans-Caucasian flyway in spring, a stronger coastal funneling of the trans-Caucasian flight, or both. Large numbers of kites engaging in over-water flights in spring did not appear to benefit from over-water thermals (Nourani *et al* 2020). This can be explained to some extent by the relatively versatile flight abilities of kites compared to other raptors (Spaar 1997), but does suggest a greater motivation of kites to minimize migration distance and duration in spring (Sergio *et al* 2014). We hope tracking studies will allow us to identify the causes of the stronger spring aggregation of this species along the eastern Black Sea coast.

ACKNOWLEDGEMENTS

Our special thanks to all the volunteers that helped us conduct the spring counts: Arthur Green, Erik Jansen, Aslan Bolkvadze, Filiep T'jollyn, Katharine Khamhaengwong, Leslie Freeman, Leo Ballering, Bjorn Alards, Ron Lawie, Mohammad A. Tabari, Rosena Tomova, Marijn Prins, Geoff Oliver, Theo Askov, Nina Askov and Mehmet Deli. The counts would not have been possible without the hospitality of our host Ruslan Lomadze and family; OSME for their financial support; Tinatin Zoidze and the Tourism department of Batumi; Gerard Troost of www.trektellen.nl; Daniel Berkowic for providing his unpublished research data; Armen Seropian for sharing his knowledge of insects and Dries Engelen for his substantive input towards this article.

LITERATURE CITED

Forsman, D. 2016. *Flight Identification of Raptors of Europe, North Africa and the Middle East*. Christopher Helm, London.

Gabelashvili, S, L Mumladze, A Bikashvili, P Sroka, R Godunko & B Japoshvili. 2017. The first annotated checklist of mayflies (Ephemeroptera: Insecta) of Georgia with new distribution data and a new record for the Country. *Turkish Journal of Zoology* 42: 252-262.

Horvitz, N, N Sapir, F Liechti, R Avissar, I Mahrer & R Nathan. 2014. The gliding speed of migrating birds: slow and safe or fast and risky? *Ecology Letters* 17: 670-679.

Hoekstra, B, J Jansen, D Engelen, F de Boer, R Benjumea, J Wehrmann, S Cavaillès, T Kaasiku, D Jansen, P Fetting, A Aintila & WMG Vansteelant. 2020. Batumi Raptor Count: from migration counts to conservation in a raptor flyway under threat. *British Birds* 113: 439-460.

Karyakin, I. 2017. Problem of identification of Eurasian subspecies of the black kite and records of the pariah kite in southern Siberia, Russia. *Raptors Conservation* 34: 49–67.

Kumar, N, U Gupta & YV Jhala. 2020. GPS-telemetry unveils the regular high-elevation crossing of the Himalayas by a migratory raptor: implications for definition of a "Central Asian Flyway". *Sci Rep* 10**:** 1-9.

Lazaro, G. R. 2021. Eastern Black Kites in Europe: a new look. https://subalpinebirding.com/blog/eastern-black-kites-in-europe-a-new-look. [Accessed 1 February 2021]

Literak, I, S Ovciarikova, J Skrabal, H Matusik, R Raab, P Spakovszky & B Kalocsa. 2020. Weather-influenced water-crossing behaviour of black kites (*Milvus migrans*) during migration. *Biologia* 76: 1267-1273.

Nourani, E, WMG Vansteelant, P Byholm & K Safi. 2020. Dynamics of the energy seascape can explain intra-specific variations in sea-crossing behaviour of soaring birds. *Biology Letters* 16: 1-5.

Panuccio, M, N Agostini, U Mellone & G Bogliani. 2014. Circannual variation in movement patterns of the Black Kite (*Milvus migrans migrans*): a review. *Ethology Ecology and Evolution* 26: 1-18.

Porter, R & M Beaman. 1985. A resume of raptor migration in Europe and the Middle East. *ICBP Technical Publication* 5: 237-242.

Sergio, F, A Tanferna, R Stephanis, LL Jiménez, J Blas, G Tavecchia & F Hiraldo. 2014. Individual improvements and selective mortality shape lifelong migratory performance. *Nature* 515: 410-413.

Sharma, SK & KC Soni. 2017. Feeding behaviour of Indian black kite (*Milvus migrans*) inhabiting the arid zone of Rajasthan. *Int J Zool Stud* 2: 58-61.

Santos, CD, JP Silva, AR Munoz, A Onrubia & M Wikelski 2020. The gateway to Africa: What determines sea crossing performance of a migratory soaring bird at the Strait of Gibraltar? *J Anim Ecol* 89: 1317-1328.

Shirihai, H & DA Christie. 1992. Raptor migration at Eilat. *British Birds* 85: 141-186.

Spaar, R. 1997. Flight strategies of migrating raptors: a comparative study of interspecific variation in flight characteristics. *Ibis* 139: 523-535.

Tal, T & D Jansen. 2019. Spring Report 2019. https://www.batumiraptorcount.org/spring-report-2019. [Accessed 1 February 2021]

Üner, Ö, KA Boyla, E Bacak, E Birel, I Çelikoba, C Dalyan, E Tabur & Ü Yardim. 2010. Spring migration of soaring birds over the Bosphorus, Turkey, in 2006. *Sandgrouse* 32: 20-33.

Vansteelant, WMG, J Wehrmann, D Engelen, J Jansen, B Verhelst, R Benjumea, S Cavailles, T Kaasiku, B Hoekstra & F Boer. 2020. Accounting for differential migration strategies between age groups to monitor raptor population dynamics in the eastern Black Sea flyway. *Ibis* 162: 356–372.

Vansteelant, WMG, B Verhelst, J Shamoun-Baranes, W Bouten, EE van Loon & KL Bildstein. 2014. Effect of wind, thermal convection, and variation in flight strategies on the daily rhythm and flight paths of migrating raptors at Georgia's Black Sea coast. *J Field Ornithol* 85: 40–55.

Verhelst, B, J Jansen & WMG Vansteelant. 2011. South West Georgia: an important bottleneck for raptor migration during autumn. *Ardea* 99: 137-146

Wehrmann, J, F Boer, R Benjumea, S Cavailles, D Engelen, J Jansen, B Verhelst & WMG Vansteelant. 2019. Batumi Raptor Count: autumn raptor migration count data from the Batumi Bottleneck, Republic of Georgia. *Zookeys* 836: 135-157.

Tohar Tal, Diego Jansen, Wouter MG Vansteelant, Batumi Raptor Count (BRC) foundation Arendtweg 84, 1349CM Almere, The Netherlands. tohar.tal@batumiraptorcount.org