

## GULL ATTACKS ON MIGRATING BIRDS AT ADA ISLAND (S MONTENEGRO)

### Napadi galebov na ptice selivke na otoku Ada (J Črna gora)

DEJAN BORDJAN<sup>1</sup>, IVAN KLJUN<sup>2</sup>

<sup>1</sup> Oddelek za gozdarstvo in obnovljive gozdne vire, Biotehniška fakulteta, Univerza v Ljubljani, Večna pot 83, SI-1000 Ljubljana, e-mail: dejan.bordjan@gmail.com

<sup>2</sup> DOPPS – Društvo za opazovanje in preučevanje ptic Slovenije, Tržaška cesta 2, SI-1000 Ljubljana, Slovenija, e-mail: ivan.kljun@dopps.si

#### 1. Introduction

Migration poses a high risk for birds as they can experience mortality rates 15 times higher compared to that in stationary periods (SILLET & HOLMES 2002). Abundant evidence points to heavy mortality of migrating landbirds during long sea-crossings (NEWTON 2008). One of the dangers faced by migrant passerines are specially adapted avian predators like Eleonora's Falcon *Falco eleonora* and Sooty Falcon *F. concolor* (NEWTON 2008) in addition to opportunistic predatory species, like gulls (MACDONALD & MASON 1973). Yellow-legged gulls *Larus michahellis* are omnivorous. The species is well known as a scavenger, food-pirate and for its predatory habits by taking birds in aerial-pursuits (e.g. passerines at sea; MACDONALD & MASON 1973, WITT 1974). In some species predation by Yellow-legged gulls can account for a large percentage of total mortality (e.g. up to 33% in Storm Petrels *Hydrobates pelagicus* at Benidorm Island in Spain) (ORO *et al.* 2005). Other studies have shown that specialized individuals perform most of the kills (ORO *et al.* 2005, GUILLEMETTE & BROUSSEAU 2001, FINNEY *et al.* 2001). Similarly, the Black-headed gull *Chroicocephalus ridibundus* exploits a very wide range of potential food items, including occasional predation on songbirds (CRAMP 1985). Particularly at the northern shores of the Mediterranean Sea and

in the Atlantic, the populations of Yellow-legged gull have increased considerably in the second half of the 20<sup>th</sup> century (VIDAL *et al.* 1998). An example are the breeding numbers on Berlenga Island (120 ha), Portugal, where the population rose from c. 1000 breeding pairs (bp) in June 1939 to a peak of c. 22.500 bp in 1994 (MORAIS *et al.* 1998). Such a high breeding density in large nesting colonies can cause serious damage to other animal and plant species, especially if their populations are weak or have a very limited range (VIDAL *et al.* 1998). In contrast, the Black-headed gull experienced a moderate decline in Europe in the period between 1980 and 2015 (EBCC 2017).

In a study of bird migration by ground observations at the east coast of the Adriatic Sea in Montenegro (SACKL *et al.* 2014, 2016), Yellow-legged and Black-headed gulls were regularly present in numbers up to several 100 birds. While the study aimed to document the magnitude of visual bird migration at the coast off the Bojana-Buna Delta (Montenegro/Albania) we used the opportunity to evaluate the impact of gulls on migrating birds.

#### 2. Methods and study area

Migrating birds were counted from the end of February till the beginning of April 2015 on a daily basis between sunrise till at least noon. Gull attacks were studied for 32 consecutive days between 17 Mar and 10 Apr 2015. Altogether we covered 205.2 observation hours. The observation point was located on the seafront of Ada Island at the mouth of Bojana-Buna River at the border between Montenegro and Albania. The study area and also the detailed method of bird-migration monitoring is described in more detail by SACKL *et al.* (2014). There are two main directions of migration at the site, along the coast to SE (i.e. ducks, gulls, loons, some waders) and from the sea to the coast in NE direction (i.e. some waders, birds of prey, herons) (SACKL *et al.* 2016). Our study was conducted within a study of waterbird migration at the south-east coast of the Adriatic Sea. While scanning the horizon for migrating waterbirds, birds from other taxonomic groups were also observed. They were identified to species if possible. While observing migrating birds gull behaviour was recorded. We

recorded the species of the attacker and the species and the number of birds being attacked. We also recorded whether or not the attack was successful, i.e. the attacked bird was caught and/or eaten.

### 3. Results

Between 24 and 334 gulls of two to eight species were present on any given day in the selected period, not including actively migrating birds (Table 1). Two of the most abundant species, Black-headed and Yellow-legged gulls, represented 37–100% of gulls present. During the same period, we observed 20 attacks involving 22 individuals of six species and on one unidentified passerine. In four instances gulls attacked birds of prey, in two Hoopoe *Upupa epops* and in 16 cases passerines. Except for two cases when groups of two individuals were attacked, gulls attacked individuals migrating singly. In all cases more than one gull was involved. Three species of gulls were observed to attack migrants: Black-headed *Chroicocephalus ridibundus*, Yellow-legged *Larus michahellis* and Mediterranean gull *Ichthyaetus melanocephalus*. Only Yellow-legged gulls were observed attacking birds of prey (i.e.: Marsh Harrier *Circus aeruginosus* and Short-eared Owl *Asio flammeus*), while all three species attacked other taxons of migrants. In two cases an attack

was successful: one Black-headed gull caught and ate a Robin *Erithacus rubecula* and a Yellow-legged gull caught and ate a Skylark *Alauda arvensis*. Thus, attacks were successful in 12.5% of observed cases ( $n = 20$ ). Both passerines and Hoopoes reacted in the same way when attacked. In all cases attacked birds tried to stay above the attackers by continuously ascending to higher altitudes until they reached the shore where they plummeted into the forest behind the shoreline. This usually worked well and the gulls retreated after the attacked bird reached the shore. In case of a successful attack Yellow-legged gulls were taking turns in attacking the Robin and finally a Black-Headed gull joined in, caught it and ate it. In the case of Skylark, the bird seemed exhausted and was already flying very close to water. When it landed only a few meters from shore it was caught and eaten by one of the Yellow-legged gulls.

In the studied period 2,021 passerines (of 29 taxa), 20 Hoopoes and 128 birds of prey (of 11 taxa) were recorded. Gulls attacked 0.8% of all observed migrating passerines (Table 2). This percentage was higher (1.3%) when active fliers like swallows were excluded. On the other hand, when only birds migrating alone and birds migrating in pairs were included, the attack rate was 9.5%. The highest percentage of attacked individuals was registered with Robin (20.4%). The only observed

**Table 1:** Gulls *Laridae* present (not migrating) at the coast of Ada Island at the river mouth of the Bojana-Buna River, 17 Mar to 10 Apr 2015.

**Tabela 1:** Galebi *Laridae* prisotni na obali otoka Ada na ustju reke Bojane-Bune na meji med Črno goro in Albanijo, 17. 3.–10. 4. 2015.

	No. of individuals in period 17.3.–10.4.2015				
	Sum	Min	Average	Max	Days present (%)
<i>Chroicocephalus genei</i>	7	1	1	1	22.6
<i>Chroicocephalus ridibundus</i>	1123	3	36	88	100.0
<i>Hydrocoloeus minutus</i>	150	1	12	24	41.9
<i>Ichthyaetus melanocephalus</i>	213	1	12	105	58.1
<i>Larus canus</i>	47	1	2	6	71.0
<i>Larus cachinnans</i>	1	1	1	1	3.2
<i>Larus michahellis</i>	1066	4	34	281	100.0
<i>Larus fuscus</i>	3	1	2	2	6.5

Wren coming in from the open sea was attacked. Robins that mostly migrated singly (88.5%) were attacked in around one in five cases. On the other hand, Skylarks migrated mostly in groups with only around five percent of individuals migrating singly or in pairs and only 0.5% individuals were attacked. Those migrating singly or in pairs were attacked in almost 10% of cases. We recorded 20 migrating Hoopoes and observed two attacks on this species. Birds of prey were attacked in much lower percentages than passerines. Most of the recorded raptor species are fast flyers, like falcons (43 individuals) or large and heavier species, like Osprey *Pandion haliaetus* (4 individuals). Out of 65 harriers (*Circus* sp.) only one attack was recorded. On the other hand, 15 ind. of owls (Strigiformes) were recorded and they were attacked in three cases.

4. Discussion

Based on our data, around one percent of all passerines approaching the mainland from the

Adriatic Sea can expect an attack by gulls. Species with slower flight speeds, i.e. owls and Hoopoes, and species which mostly migrate singly, i.e. owls and Robins, appear to be more prone to attacks. Birds migrating across the sea lose weight and if conditions are unfavourable can be exhausted upon reaching the land (NEWTON 2008). We observed apparent exhaustion several times. One Robin landed twice on the surface of the sea before landing on the shore, where it rested exposed on the sand for at least five minutes. Also, especially exhausted birds and birds flying low are the main target of gulls (MACDONALD & MASON 1973). Our observations support this, since one of two killed birds was a Skylark with apparent signs of exhaustion. Unlike Ada where smaller species were attacked more often, MACDONALD & MASON (1973) report the most frequently attacked species to be thrush-size species like Starlings *Sturnus vulgaris* and Blackbirds *Turdus merula*.

In some areas larger numbers of predators accumulate in response to potential prey and can

**Table 2:** Migration volume and numbers of migrants attacked by gulls in front of the river mouth of the Bojana-Buna River, 17 Mar to 10 Apr 2015

**Tabela 2:** Število selivk in selivk, ki so jih napadli galebi na ustju reke Bojane-Bune, 17. 3.–10. 4. 2015.

	No. of migrating individuals between 17.3–10.4.2015		No. of attacks	% of attacked individuals		% of killed individuals	
	all individuals	birds migrating singly or in pairs		all individuals	birds migrating singly or in pairs	all individuals	birds migrating singly or in pairs
<i>Alauda arvensis</i>	588	31	3	0.5	9.7	0.2	3.2
<i>Erithacus rubecula</i>	61	54	11	18.0	20.4	1.6	1.9
<i>Troglodytes troglodytes</i>	1	1	1	100	100.0		
Unidentified Passeriformes	37	5	1	2.7	20.0		
All Passeriformes	2021	370	16	0.8	4.3		
Passeriformes without hirundines	1207	168	16	1.3	9.5		
<i>Upupa epops</i>	20	16	2	10	12.5		
<i>Asio flammeus</i>	13	11	3	23.1	27.3		
<i>Circus aeruginosus</i>	61	57	1	1.6	1.8		
All Birds of prey	128	108	4	3.1	3.7		

remove up to 10 % of migrants of a certain prey species (NEWTON 2008), which is similar to our study. Difference being, that in the present case the attackers were opportunistic and not obligatory predators. The lack of predator accumulation at Ada may be the result of a widely dispersed migration of passerines across the Mediterranean (NEWTON 2008) or simply of low passerine migration across the Adriatic. Gulls are widespread species along the coasts of Europe and MACDONALD & MASON (1973) believed that they may be one of the most important predators of many species of small migrating birds. Although there are at least five falcons adapted to take either spring or autumn migrants across the Mediterranean (NEWTON 2008), it would seem likely that in case of sparse or unpredictable migration where only opportunistic predation is feasible, gulls would have important impact on small migrants. Migration can account for up to 85 % of apparent annual mortality (SILLET & HOLMES 2002) and the relative importance of this mortality to overall annual mortality is unclear (NEWTON 2008). It is thus difficult to estimate the impact of gull attacks on migrants. Also, the mortality of migrants may be increased by other opportunistic predators, like Hooded Crow (ZDUNIAK *et al.* 2008), that were also present on Ada.

### Acknowledgments:

The present study would not be feasible without the support of Euronatur and the Adriatic Flyway project within which the study of waterbird migration at the south-east coast of the Adriatic Sea was carried out.

### 5. Abstract

Migration poses a high risk to birds. Crossing of large bodies of water is especially demanding for land birds. One of the dangers faced by migrants are opportunistic predators like gulls. Most gulls Laridae are generalist predators with omnivorous diets. Attacking on migrating birds was investigated during ground observations of bird migration at Ada Island (S Montenegro) between 17 Mar and 10 Apr 2015. We recorded 20 attacks on 22 individuals of six species and on one unidentified passerine. In four instances gulls attacked birds of prey, in two

Hoopoe *Upupa epops* and in 16 passerines. Except for two cases when small flocks of two birds were attacked, gulls attacked individuals migrating singly. Considering our data around one percent of passerines migrating during the day across the southern Adriatic Sea can expect to be attacked by gulls. This percentage can be as high as 9.5% for passerines migrating singly.

### Povzetek

Tekom življenja selitev pogosto pticam predstavlja obdobje z največjo smrtnostjo. Za kopenske vrste je še posebej zahtevno prečkanje večjih vodnih površin, kot so morja. Ena izmed nevarnosti za selivke so ob specializiranih plenilcih kot so sokoli *Falco*, so priložnostni plenilci kot so na primer galebi. Večina vrst galebov Laridae je vsejedi in oportunističnih plenilcev. Med 17.3. in 10.4.2015 sva avtorja na otoku Ada v izlivu reke Bojane na meji med Črno goro in Albanijo beležila napade galebov na ptice selivke. V napadih so bile zabeležene tri vrste galebov, rumenonogi *Larus michahellis*, rečni *Chroicocephalus ridibundus* in črnoglavi galeb *Ichthyetus melanocephalus*. Skupaj je bilo zabeleženih 20 napadov na 22 osebkov šestih vrst in na eno nedoločeno vrsto ptice pevke. V štirih primerih so galebi napadli ujedo oz. sovo, v dveh smrdokavro *Upupa epops* in v 16 ptico pevko. Z izjemo dveh primerov, ko je bil napad izveden na skupino dveh osebkov, so bile napadene posamezne ptice. Največ napadov je bilo zabeleženih na taščico *Erithacus rubecula* (11 napadenih osebkov, kar predstavlja 18% vse opazovanih taščic), po deležih pa na močvirsko uharico (3; 23,1%). Glede na zbrane podatke galebi napadejo približno 1 % ptic, ki se tekom dneva selijo čez južni Jadran. Za ptice pevke, ki se selijo posamič, je ta odstotek bistveno višji (9,5 %).

**Key words:** selitev, galebi

**Ključne besede:** migration, gulls

### 6. References

- CRAMP S. (1985): Handbook of the Birds of Europe, the Middle East and North Africa. The Birds of the Western Palearctic. Volume IV Terns to Woodpeckers. – Oxford University Press, Oxford.

- EBCC (2017): Trends of common birds in Europe, 2017 update. – [<http://www.ebcc.info/index.php?ID=631>], 25/01/2018.
- FINNEY S. K., WANLESS S., HARRIS M. P., MONAGHAN P. (2001): The impact of gulls on puffin reproductive performance: an experimental test of two management strategies. – *Biological Conservation* 98: 159–165.
- GUILLEMETTE M., BROUSSEAU P. (2001): Does culling predatory gulls enhance the productivity of breeding common terns? – *Journal of applied Ecology* 38: 1–8.
- MACDONALD S. M., MASON C. F. (1973): Predation of migrant birds by gulls. – *British Birds* 66: 361–363.
- MORAIS L., SANTOS C., VICENTE L. (1998): Population increase of Yellow-legged gulls *Larus cachinnans* breeding on Berlenga island (Portugal), 1974–1994. – *Sula* 12: 27–37.
- NEWTON I. (2008): *The Migration Ecology of Birds*. – Academic Press, London.
- ORO D., DE LEON A., MINGUEZ E., FURNESS R. W. (2005): Estimating predation on breeding European storm-petrels (*Hydrobates pelagicus*) by yellow-legged gulls (*Larus michahellis*). – *Journal of Zoology* 265: 421–429.
- SACKL P., SCHNEIDER-JACOBY M., STUMBERGER B. (2014) – Planbeobachtungen des sichtbaren Vogelzuges vor dem Bojana-Buna-Delta (Montenegro /Albanien) an der südöstlichen Adria im März 2010. – *Der Ornithologische Beobachter* 111 (3): 187–232.
- SACKL P., BORDJAN D., BASLE T., BOŽIČ L., SMOLE J., DENAC D., ŠTUMBERGER B. (2016): Spring migration of ducks in the Bojana-Buna Delta – a comparison of migration volumes and conventional count information for a key wetland site within the Adriatic Flyway. pp. 129–149. In: SACKL P., FERGER S. W. (eds.): *Adriatic Flyway — Bird Conservation on the Balkans*. Euronatur, Radolfzell.
- SILLETT T. S., HOLMES R. T. (2002): Variation in survivorship of a migratory songbird throughout its annual cycle. – *Journal of Animal Ecology* 71: 296–308.
- VIDAL E., MEDAIL F., TATONI T. (1998): Is the yellow-legged gull a superabundant bird species in the Mediterranean? Impact on fauna and flora, conservation measures and research priorities. – *Biodiversity and Conservation* 7: 1013.
- ZDUNIAK P., KOSICKI J. Z., GOŁDYN B. (2008): Un-paint it black: Avian prey as a component of the diet of nestling Hooded Crows *Corvus cornix*. – *Belgian Journal of Zoology* 138 (1): 85–89.

Prispelo / Arrived: 2. 2. 2018

Sprejeto / Accepted: 12. 7. 2018