

TENGMALM'S OWL *Aegolius funereus* FOUND IN BARE KARST AREA OF PAG ISLAND (N DALMATIA, CROATIA)

Koconogi čuk *Aegolius funereus* najden v goli kraški krajini otoka Paga (S Dalmacija, Hrvaška)

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1. Introduction

In central and southern Europe, Tengmalm's Owl *Aegolius funereus* breeding population is supposed to be a glacial relict from the post-glacial epoch (MIKKOLA 1983, KORPIMÄKI 1997). In this part of Europe, its breeding range is confined to mixed and coniferous forests at higher altitudes (KORPIMÄKI 1997, VREZEC 2003). It rarely breeds lower than 500 m a.s.l., but the bulk of the population is confined to the elevations over 1000 m a.s.l. (PEDRINI 1982, DEJAIFVE *et al.* 1990, MÁRZ 1995, AUGST 2000, VREZEC 2004). However, as part of the population (young and females) is nomadic in the non-breeding period (SAUROLA 1995), they can move to the areas where they otherwise do not breed, e.g. at low altitudes (DOBRYNINA 1994, TOME & VREZEC 2000).

In Croatia, the main breeding range of Tengmalm's Owl covers large montane forests of Gorski Kotar, Plitvička jezera and Velebit (RADOVIĆ *et al.* 2005). The species is very rare in the coastal part of Croatia. So far, only four certain winter and spring records have been made there, i.e. in the vicinity of the town of Senj (13 Dec 1902, 11 Mar 1903, 23 Mar 1933), while a single male was collected in Dubrovnik area at Zagospom (20 Nov 1895). It should be noted, however, that all these records are more than 70 years old (KRALJ 1997, LUKAČ & BALTIĆ 2001). According to RUCNER (1998), the species probably breeds in the coastal part of Croatia in high-elevated pine forests on the mainland, for example at Mt. Učka. So far, there have been no records from Croatia that would confirm dispersion of Tengmalm's Owl individuals to the islands and migration over the sea, where the habitat is completely different compared to its breeding habitat in montane forests.

2. Study area and method

Pag is one of the biggest Croatian islands with 285 km² surface area and length of 58 km. Its landscape is very heterogeneous, a product of geographic features, climatic conditions (e.g. strong winds that carry salty water) and human land-use (e.g. sheep and goats stockbreeding, tree felling). The island's NE part that faces Mt. Velebit is generally treeless as bare karst area (Figure 1). Central and SW parts have a more developed vegetation cover with wood patches that typically consist of secondary pine woods and maquis (HORVATIĆ 1963). They cover approximately 15% of the island's surface. In the last decades, the partial abandonment of stockbreeding and farming resulted in recovery of the vegetation cover in certain bare landscape areas (FARIČIĆ 2004).



Figure 1: Almost treeless bare karst landscape of the island of Pag (N Dalmatia, Croatia) where Tengmalm's Owl *Aegolius funereus* was found (photo: D. Denac)

Slika 1: Gola, suha in z drevesi praktično povsem neporasla kraška pokrajina na otoku Pagu (S Dalmacija, Hrvaška), kjer je bil najden koconogi čuk *Aegolius funereus* (foto: D. Denac)

Seven wind power turbines with total power of 5.6 MW have recently been installed on the »Ravna« plateau (approx. 200 m a.s.l.) of Mt. Dolac, which is situated NE from the village of Pag. The ground under the wind power turbines was checked for dead birds as collision victims.

We determined the age of Tengmalm's Owl carcass following MARTINEZ *et al.* (2002), and sex according to biometric data compared to CRAMP (1985) and KÖNIG *et al.* (1999).

3. Results and discussion

The ground under six out of totally seven wind power turbines on Mt. Dolac (island of Pag) was checked on 28 Apr 2005. Peregrine Falcon *Falco peregrinus* and Griffon Vulture *Gyps fulvus* had been observed flying just past the operating turbines a few days earlier. Under the turbine marked with number 5, a dead Tengmalm's Owl was found (Figure 2). The bird was lying below the edge of the propeller blade and had clearly been there for some days. Its skull was crushed, indicating the collision as the cause of its death. According to the wing moulting pattern, the owl was a juvenile (spring 2Y), since all wing feathers were of one generation only. We collected some biometric data: wing length 162 mm, bill length to forehead 20.8 mm, bill length to cere 14.8 mm, and tarsus 23.0 mm. We compared the data with the published references and concluded that the owl was a male.



Figure 2: Carcass of a young (spring 2Y) male Tengmalm's Owl *Aegolius funereus* found on 28 Apr 2005 under the turbine at the »Ravna 1« wind farm on Mt. Dolac, island of Pag (photo: D. Denac)

Slika 2: Kadaver mladega (pomlad 2Y) samca koconogega čuka *Aegolius funereus*, najden 28.4.2005 pod vetrnico v vetrni elektrarni »Ravna 1« na gori Dolac na otoku Pagu (foto: D. Denac)

We assumed that the killed individual had most probably migrated from the nearest mountain massive of Velebit, where the Tengmalm's Owl is known to breed (KRALJ 1997, RADOVIĆ *et al.* 2005). If flying directly from Velebit, the bird must have crossed some 10 km of the open sea. It is known from Croatia that some typical forest owl species can occasionally migrate over the sea, e.g. Tawny Owl *Strix aluco* (ELERŠEK 2002) or Ural Owl *Strix uralensis* (ŠTUMBERGER 2000), so this habit can also be expected in Tengmalm's Owl. In Northern Europe, the migration of Tengmalm's Owls to non-breeding areas in the autumn starts at the end of August and lasts till the end of October (PAKKALA *et al.* 1994). Since the owl was found on the island of Pag in spring (April), when Tengmalm's Owl breeding season already starts (MÄRZ 1995), we can only speculate that it had spent the winter on Pag. The other issue addressed from the find is the habitat. PAKKALA *et al.* (1994) reported that Tengmalm's Owls move within their potential breeding range and habitat during the search for suitable prey rich areas in the non-breeding period. However, the area on Mt. Dolac as well as the major part of Pag island is an almost treeless open rocky terrain with only xeric grasslands (e.g. *Salvia officinalis*, *Asparagus acutifolius*, *Crocus reticulatus*, *Asphodeline lutea*, *Ruscus aculeatus*, *Rubia peregrina*, *Reichardia picroides*, *Stachis salviaefolius*, *Marrubium incanum*, *Stipa pennata*, *Viola* sp., *Inula candida*, *I. viscosa*, *Drypis spinosa*, *Scolymus hispanicus*), some bushes (e.g. *Quercus ilex*, *Q. pubescens*, *Phillyrea media*, *Juniperus oxycedrus*, *Rubus ulmifolius*) and isolated pine trees (Figure 1), much different from the Tengmalm's Owl breeding habitat in large montane forest complexes. However, the bird had possibly used some small planted pine woods (*Pinus nigra*, *P. halepensis*, *P. pinaster*), since deciduous forest associations, e.g. *Orno-Quercetum ilicis* and *Carpinetum orientalis croaticum*, are degraded on the island and are mainly present in the vegetation form of maquis (HORVATIĆ 1963).

In general, the non-breeding habitat of migrating Tengmalm's Owls is still poorly known. It is known that during the winter Tengmalm's Owls can use small forest patches in otherwise open areas (KNAUS & BRUDERER 1997, TOME & VREZEC 2000), but our case opens a completely different view of Tengmalm's Owl habitat use. There is a need for more detailed studies of the non-breeding habitat selection in typical forest owl species, considering that their survival also depends on habitat quality and food conditions during the non-breeding period. In future studies, it would therefore be necessary to record habitat range occupied by forest owls during the non-breeding

period, and to evaluate the overall importance of these habitats for owl populations.

At the end, we would like to open another point of view closely associated with the find presented, the effect of wind farms on birds. Wind farms can be an alternative energy source, but their impact on nature, especially birds, should be suitably assessed. When erected, detailed monitoring programme is needed to evaluate their actual impact (ANDERSON 1999). To our knowledge, no such monitoring programme exists at the discussed wind farm. Considering the data presented, such monitoring would be of course highly recommendable. Edges of rotor blades on the turbines are indeed painted red, which can make them more detectable by birds during the day, but in the night such marks are ineffective and other techniques should be implicated to reduce the impact on owls as well as on other night active birds.

Povzetek

Dne 28.4.2005 je bil na Pagu na goli kraški planoti »Ravna« (cca. 200 m n.v.) gore Dolac najden mrtev koconogi čuk *Aegolius funereus*, mlad (2Y) samec. Najdba je zanimiva, ker gre za enega redkih podatkov o pojavljanju koconogega čuka na obalnem predelu Hrvaške. Doslej so bili za to območje potrjeni le štirje podatki, tri iz okolice Senja in en iz okolice Dubrovnika (Zagospom), in vsi so starejši od 70 let. Koconogi čuk je na Pag najverjetneje migriral s svojih najbližjih gnezdišč na Velebitu. Znano je namreč, da je del populacije koconogega čuka, posebej mlade ptice in samice, zunaj gnezditvenega obdobja nomadski. Odpira se vprašanje habitata, v katerem je ptica bivala na Pagu, saj naj bi koconogi čuk tudi zunaj gnezditve izbiral potencialni gnezditveni habitat, to pa so v Evropi mešani in iglasti gozdovi višjih leg. Kadaver z zdrobljeno lobanjo je bil najden pod peto vetrnico v vetrni elektrarni Ravna 1. Vzrok smrti je bil trk z vetrnico. Po naših podatkih v tej vetrni elektrarni ne opravljajo študije vpliva elektrarne na smrtnost ptic, kar bi bilo po tujih priporočilih in upoštevajoč omenjeno najdbo nujno potrebno.

Summary

On 28 Apr 2005, a dead young (2Y) male Tengmalm's Owl *Aegolius funereus* was found on the island of Pag (N Dalmatia, Croatia) in bare karst area of the rocky Ravna plateau (app. 200 m a.s.l.) of Mt. Dolac. So far, only four published data of Tengmalm's Owl occurrence in the coastal part of Croatia exist, and all of them are older than 70 years. The bird most

probably migrated to the island from its nearest breeding area – Mt. Velebit. According to the literature, part of the population, especially young birds and females, are nomadic during the non-breeding period. But the question on the habitat used on the island of Pag remains open. It is known that during the non-breeding period, Tengmalm's Owls usually move within their potential breeding range and habitat, which is probably not the case as far as this find is concerned. The carcass was found under the turbine of the wind farm, and collision with the turbine was clearly the cause of the bird's death. To our knowledge, no monitoring to evaluate the impact of the discussed wind farm on bird mortality exists, but should certainly be started in view of the references and data presented herewith.

References

- ANDERSON, R., MORRISON, M., SINCLAIR, K. & STRICKLAND, D. (1999): Studying wind energy / bird interactions: a guidance document. – National Wind Coordinating Committee, Washington.
- AUGST, U. (2000): Tengmalm's Owl (*Aegolius funereus*) in the National Park "Sächsische Schweiz" (Saxony). – Mitt. Ver. Sächs. Ornithol. 8: 465–474.
- CRAMP, S., ed. (1985): The Birds of the Western Palearctic, Vol. IV. – Oxford University Press, Oxford, New York.
- DEJAIFVE, P.A., NOVOA, C. & PRODON, R. (1990): Habitat et densité la Chouette de Tengmalm *Aegolius funereus* à l'extrémité orientale des Pyrénées. – Alauda 58: 267–273.
- DOBRYNINA, I.N. (1994): Seasonal movements of owls (Strigiformes) in the Baltic region based on ringing data. – The Ring 16 (1/2): 77–83.
- ELERŠEK, T. (2002): Lesna sova *Strix aluco*. – Acrocephalus 23 (115): 199.
- FARIČIĆ, J. (2004): Pag – otok na dodiru geografskih mikrosvijetova. [http://www.geografija.hr]. Downloaded: 18.11.2005.
- HORVATIĆ, S. (1963): Vegetacijska karta otoka Paga s općim pregledom vegetacijskih jedinica hrvatskog primorja. – Prirodoslovna istraživanja JAZU, serija Acta biologica 33 (4): 5–181.
- KNAUS, P. & BRUDERER, D. (1997): Winternachweis eines Rauhfußkauzes (*Aegolius funereus*) im Vorarlberger Rheindelta [A winter record of Tengmalm's Owl (*Aegolius funereus*) from the delta of the river Rhine in Vorarlberg]. – Egretta 40 (2): 147–148.
- KÖNIG, C., WEICK, F. & BECKING, J.H. (1999): Owls, a Guide to the Owls of the World. – Pica Press, Sussex.
- KORPIMÄKI, E. (1997): Tengmalm's Owl *Aegolius funereus*. pp. 420–421 In: HAGEMAJER, W.J.M. & BLAIR, M.J. (eds.): The EBCC Atlas of European Breeding Birds. – T & AD Poyser, London.
- KRALJ, J. (1997): Croatian Ornithofauna in the Last 200 Years [Ornithofauna Hrvatske tijekom posljednjih dvjesto godina]. – Larus 46: 1–112.

- LUKAČ, G. & BALTIC, M. (2001): Diversity and richness of the ornithological collection of the wider Dubrovnik area (Croatia). – Nat. Croat. 10 (4): 321–365.
- MARTINEZ, J.A., ZUBEROGOITIA, I. & ALONSO, R. (2002): Rapaces Nocturnas. Guía para la determinación de la edad y el sexo en las Estrigiformes ibéricas. – Monticola Ed., Madrid.
- MÄRZ, R. (1995): Der Rauhfußkauz. – Die Neue Brehm-Bücherei, Bd. 394, Westrap Wissenschaften, Spektrum Akademischer Verlag, Heidelberg.
- MIKKOLA, H. (1983): Owls of Europe. – T & AD Poyser Ltd, London.
- PAKKALA, H., OJANEN, M. & TYNJÄLÄ, M. (1994): On the autumn movements of the Tengmalm's Owl (*Aegolius funereus*) at the Tauvo bird observatory, Northern Finland. – The Ring 16 (1/2): 70–76.
- PEDRINI, P. (1982): Distribuzione altitudinale di Alcuni Strigidae in Val di Tovel (Trentino). – Avocetta 6: 83–89.
- RADOVIĆ, D., KRALJ, J., TUTIŠ, V., RADOVIĆ, J. & TOPIĆ, R. (2005): Nacionalna ekološka mreža. Važna područja za ptice u Hrvatskoj. – Državni zavod za zaštitu prirode, Zagreb.
- RUCNER, D. (1998): Ptice hrvatske obale Jadrana. – Hrvatski prirodoslovni muzej, Ministarstvo razvitka i obnove, Zagreb.
- SAUROLA, P. (1995): Suomen pöllöt. – Kirjayhtymä Oy, Helsinki.
- ŠTUMBERGER, B. (2000): Kozača *Strix uralensis*. – Acrocephalus 21 (98/99): 93.
- TOME, D. & VREZEC, A. (2000): Koconogi čuk *Aegolius funereus* najden na Ljubljanskem barju [Tengmalm's Owl *Aegolius funereus* found at Ljubljansko barje]. – Acrocephalus 21 (98/99): 71–73.
- VREZEC, A. (2003): Breeding density and altitudinal distribution of the Ural, Tawny, and Boreal Owls in North Dinaric Alps (central Slovenia). – J. Raptor Res. 37 (1): 55–62.
- VREZEC, A. (2004): Medvrstni odnosi med gozdnimi sovami (Strigidae) [Interspecific interactions between forest owls (Strigidae)]. – Dissertation Thesis, Dep. of Biology, Biotechnical Faculty, University of Ljubljana, Ljubljana.

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