The return of the Lesser Kestrel *Falco naumanni* as a breeding bird to Croatia

Vrnitev južne postovke *Falco naumanni* kot gnezditke na Hrvaško

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The Lesser Kestrel *Falco naumanni* is a small falcon distributed mainly in the Mediterranean, but its range continues north of the Black Sea encompassing parts of Central Asia (Hagemeijer & Iankov 1997). It breeds colonially in cliffs or in walls and roofs of buildings and inhabits steppe-like and semi-desert habitats where it preys primarily on insects, especially crickets and grasshoppers. The Lesser Kestrel is a migratory species which winters in Africa south of Sahara, with some populations remaining in the Mediterranean Basin (Cramp 1998). The species suffered a severe decline during the second half of the 20th century and went extinct in several European countries (BirdLife International 2013).

Until the first half of the 20th century, the Lesser Kestrel was a regular but rare breeder in the Mediterranean area of Croatia (Kralj 1997). Its last breeding attempt was recorded in the 1960s in Istria (Rucner 1998). In Europe, the Lesser Kestrel has recently increased in numbers in Portugal (Catry et al. 2009) and shows a positive trend in Italy and France. On the other hand, large populations in Spain and Greece are stable or are decreasing, as is the case in Macedonia and Turkey (BirdLife International 2004). As the overall population trend is considered to have been stable, the Lesser Kestrel was downlisted from vulnerable (VU) to least concern (LC) in the current Red List of IUCN (BirdLife International 2013).

At the end of July in 2008 and 2009, flocks of eight and six Lesser Kestrels, respectively, were recorded in a mountain pasture within Northern Velebit National Park at 1,300 m a.s.l. close to the Croatian coast (S. Lupret-Obradović pers. comm.). The consecutive observations of Lesser Kestrels at the locality of the Veliki Alan Mountain opened up the possibility of a post-fledging dispersion from a cryptic colony at the foothills of the Velebit Mountain chain.

During the assumed breeding season of the Lesser Kestrel between May and July in 2010, we searched the surrounding area of the Veliki Alan Mountain covering the coastal area between the town of Senj in the north and the town of Nin in the south, as well as the islands of Pag and Rab that are situated opposite the Velebit Mountain chain (Figure 1). According to Filipčič (1998), the study area has a temperate humid climate with hot summers (Köppen climate classification: Cfa). Large areas of the islands of Pag and Rab are covered by dry grasslands and extensive pastures for sheep, whereas the coastal foothills of the Velebit Mountain chain are mainly covered by garrigue. We surveyed several ruins, church towers, old buildings and natural cliffs for breeding colonies in the study area.

On 10 Jul 2010, we found one Lesser Kestrel colony consisting of 25 breeding pairs on the islet of Dolin that is adjacent to the island of Rab (Figure 1). Contrary to our expectations, the colony was made up of ground breeding birds that nested in crevices of limestone blocks and under rock (Figures 2, 3 & 4). We found three nests with four chicks in each, whose age was assessed to be about 10 days. The nests were situated at least 50 m apart from each other. By remote observations from the boat, we identified about 25 occupied nest-sites. We counted ca. 50 adult birds, which were flying frequently in and out of the colony towards the foraging area on the island of Rab. On Rab, we observed the adult birds hunting in dry pasture lands that were grazed by sheep, as well as in sparse juniper scrublands. The main identified foraging area lay within the radius of 3 km of the nesting colony, north of the Mišnjak ferry port. Some Lesser Kestrels, mostly immature ones, were recorded north of the Mišnjak ferry port. Some Lesser Kestrels, mostly immature ones, were recorded

![Figure 1](image-url)
The return of the Lesser Kestrel *Falco naumanni* as a breeding bird to Croatia as far as 10 km away in Velebit Mountain pastures and in suitable habitats over the whole island of Rab. This breeding record of the Lesser Kestrel is the first for Croatia after more than 40 years of the species’ absence (Rucner 1998). The breeding colony on the islet of Dolin emerged on the site for which there is no historic evidence of former breeding. The ground nesting of the Croatian Lesser Kestrel population is rather unusual, but has also been recorded in France (Brun & Pillard 1999) and Greece (Vlachos et al. 2004), where this nesting behaviour was induced by the competition with Jackdaws *Corvus monedula* and nest site demolition, respectively. In the present case, we assume that ground nesting on Dolin emerged due to nest site availability in crevices combined with the absence of terrestrial predators and no pronounced disturbance, although the adjacent island of Rab is a popular tourist summer destination. In addition, we have observed ground nesting of other typical cliff breeding bird species on other islets in Croatia, such as the Peregrine Falcon *Falco peregrinus*, Eleonora’s Falcon *F. eleonorae* and Rock Dove *Columba livia*. This breeding behaviour may partially be explained by the high number of islands, islets and rocks (in total 1,246) in Croatia (Duplančić Leder et al. 2004), of which only 47 are inhabited by people (Croatian Bureau of Statistics 2005).

We can only speculate whether the Croatian population originated from the Balkan Peninsula or from Italy. The Balkan Lesser Kestrel populations are stable, such as in Greece, or decreasing, such as in Macedonia and Turkey (BirdLife International 2004), which reduces the probability of range expansion. However, population estimates from those areas are less accurate (Iñigo & Barov 2010). Recent observations concern large roosting flocks of several thousand Lesser Kestrels in Albania (Minias et al. 2009). On the Balkan Peninsula, the nearest Lesser Kestrel population breeds in Macedonia some 600 km from the Croatian colony (Velevski et al. 2010). On the other hand, the Italian Lesser Kestrel population is increasing (Iñigo & Barov 2010) and is geographically the nearest, between 300 to 400 km, to the Croatian one. It has been documented that one female which hatched in southern Italy bred in the subsequent year in northern Italy, dispersing more...
than 700 km off the natal colony (Gustin et al. 2011). Moreover, pre-migration movements by the assumed south-Italian Lesser Kestrels were observed foraging on grasshoppers in northern Italy during August and September (Premuda et al. 2008).

Negro et al. (1997) showed a high degree of philopatry among Lesser Kestrels in Spain, but natal dispersal increased with population density. In addition, Olea (2001) found post-fledging movements of juvenile Lesser Kestrels in Spain up to several hundred km northwards from their native colonies. This is explained by birds creating navigation targets or mental maps, which are crucial for long distance migrants. An additional driving force for post-fledging movements could be the avoidance of competition between adult and young birds after leaving the nest and the identification of new potential breeding sites in favourable areas (Morton et al. 1991, Baker 1993).

Overall, we assume that the broad post-fledging movements could have triggered and facilitated the range expansion of Lesser Kestrels towards Croatia, which lies several hundred km north of the largest Italian and Balkan populations. It confirms the population recovery of the Lesser Kestrel in part of its Mediterranean range. However, detailed studies on population genetics and migration movements are necessary to clarify the status of the emerged Croatian Lesser Kestrel population with respect to other populations in southern Europe. In addition, the discovered Lesser Kestrel population needs to be suitably managed in order to facilitate further range expansions in the Adriatic region.

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