

Spring arched migration of black kite *Milvus migrans* over the Apuane Alps (Tuscany)

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Abstract – The aim of this study is to analyse the migration flow of black kite *Milvus migrans* observed in Northwestern Italy. Observations were carried out on the western slopes of the Apuane Alps (Capriglia, Pietrasanta, Lucca, Tuscany), over the period 4 March - 1 April 2002-2011, where 189 black kites were recorded. Most black kites observed (N = 176, 93%) had a reversed direction of spring migration, from NW to SE. The regularly observed behaviour of black kites in the Apuane Alps and the positive correlation between the migration trends at the Apuane and Arenzano (Genoa) study sites show an arched migration strategy, performed probably by a small portion of the Central Italian population, which follows the coastline to avoid crossing the Mediterranean sea, and also suggests the occurrence of a spring circuitous migration, as has been documented in the short-toed eagle.

Key words: black kite, spring circuitous migration, Apuane Alps.

INTRODUCTION

Soaring raptors are usually reluctant to cross water, because of the risks and the high energy costs of powered flight over water (Kerlinger 1985, Agostini *et al.* 1994, 2005, Panuccio *et al.* 2002, 2004). A possible consequence of that is an arched migration strategy (Berthold 2001). In addition, coastlines are important in shaping the migration pathways of migrating raptors (Kerlinger 1989).

The black kite *Milvus migrans* is a partial migrant (Kerlinger 1989), wintering mainly in Africa, south of Sahara (Cramp & Simmons 1980) and breeding in Italy with 700-1200 pairs, of which a few hundred are located in Central Italy, mainly in Latium and Tuscany (Brichetti & Fracasso 2003).

The main passage of the species during spring migration in Italy is recorded at the Strait of Messina (Sicily) (1989-1998: max 712, mean 519, Zalles & Bildstein 2000; 1996-2000: max 1008, mean 719, Corso 2001).

In the western Liguria at Arenzano (Genoa), during the spring migration black kites are regularly recorded (March and May 2004-2011: max 122 in 2007, mean 67 ind/year), and observed flying parallel to the coastline, heading E-NE (Baghino unpubl. data). The Apuane Alps (Tuscany) is an

important raptor migration site, both in spring and in autumn, mainly for short-toed eagles *Circaetus gallicus* and booted eagles *Aquila pennata* (Premuda 2007, Premuda *et al.* 2010). Circuitous migration has been particularly well documented at this site, for both the short-toed eagle (Agostini *et al.* 2002a, 2002b, Premuda 2002, 2004) and the booted eagle (Baghino *et al.* 2007, Premuda *et al.* 2007).

METHODS

Observations took place from 2002 to 2011 on the western slopes of the Apuane Alps (Tuscany), as part of the visual counts of raptor migration performed annually at the site. The main observation point used was Capriglia (Pietrasanta, Lucca), located about 5 km inland of the Tyrrhenian seacoast (43°58'2.6"N - 10°14'22.8"E, 378 m a.s.l.).

Observations were carried out over the period between 4 March to 1 April, covering from 3 to 29 days per year (average: 18 days/year), totalling 182 days and 1394 hours of observations, performed daily from about 09:00 to 17:00. For each observation, time (hh:mm), species,

number of individuals, sex and age (whenever possible), flight direction of birds (incoming and outgoing) were recorded.

In order to analyse the migration flow observed at Arenzano and at the Apuane Alps, nine simultaneous sample periods were set up at the two sites (150 km apart) in March 2003-2011. For this analysis, only black kites heading SE at the Apuane Alps were considered.

The observations were aided with binoculars and telescopes. Characters used in identifying the species are those provided by Forsman (1999).

RESULTS

A total of 189 black kites were recorded in the period over ten years (average: 18.9 ± 16.8 SD ind./year), with a seasonal maximum count of 59 ind. in 2010 (Fig. 1). The peak of the species migration during the study period occurred on 28 March (Fig. 2), with a daily maximum count of 26 ind. on 28 March 2010. Most black kites observed (93%) had a reversed direction of spring migration, from NW to SE (Figs. 1, 2), flying parallel to the seacoast, exactly like all the short-toed eagles observed in the same period. These observations involved 176 individuals (Fig. 1). All black kites that were precisely aged ($N = 55$, 29%) were adults.

The analysis of the trends at the Arenzano and the Apuane Alps sites, during the nine sample periods in March, shows a positive correlation in the species migra-

tion phenology (Spearman test, $r_s = 0.67$, $DF = 20$, $P = 0.001$, Fig. 3).

DISCUSSION

The regularly observed behaviour of black kites in the Apuane Alps and the positive correlation between the migration trends at the two study sites show an arched migration strategy (Berthold 2001), performed probably by a small portion of the Central Italian population (Tuscany, Latium), which follows the coastline to avoid crossing the Mediterranean sea, and also suggest the occurrence of a spring circuitous migration, as it has been documented in the short-toed eagle (Agostini *et al.* 2002a, 2002b, Premuda 2002, 2004). The black kites involved may have learnt the circuitous route following experienced adult individuals breeding in the Alps or North of the Alps, wintering in the same areas in Africa and entering Europe from the Strait of Gibraltar, crossing Spain and Mediterranean France, passing along the arched Ligurian coastline and then heading SE towards Central Italy as destination for breeding. Adults migrate mainly in March at the Strait of Gibraltar (Finlayson 1992) while the main passage in Southern Italy of black kites crossing the Central Mediterranean is recorded in April-May (Agostini & Duchi 1994, Panuccio & Agostini 2010), very likely involving non-breeding birds as well.

In some way, this particular route followed by only some black kites is similar to the circuitous migration of

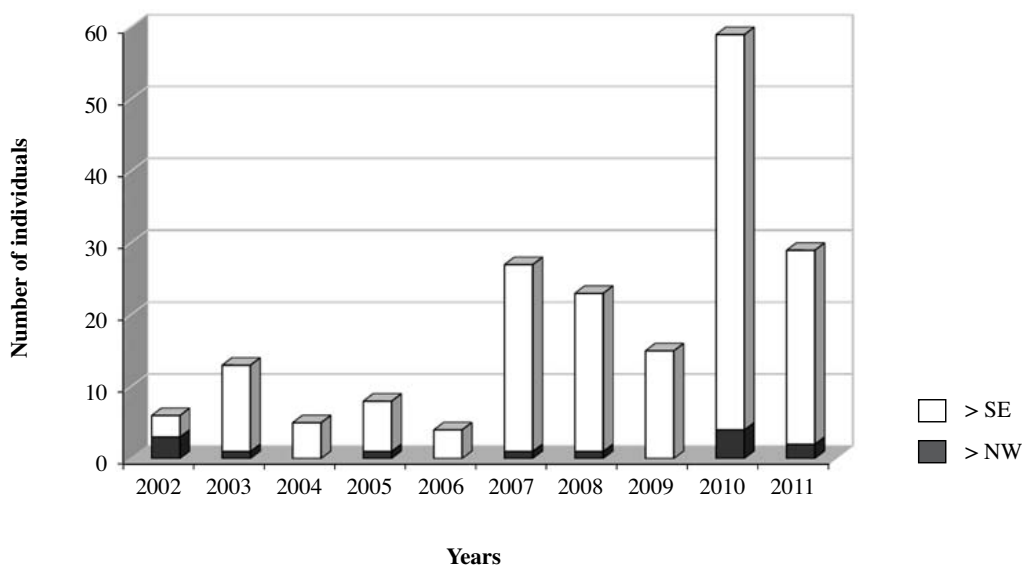


Figure 1. Trend of the black kite *Milvus migrans* migration over the study period at the Apuane Alps, all individuals included (heading NW and heading SE)

Spring arched migration of black kite over the Apuane Alps

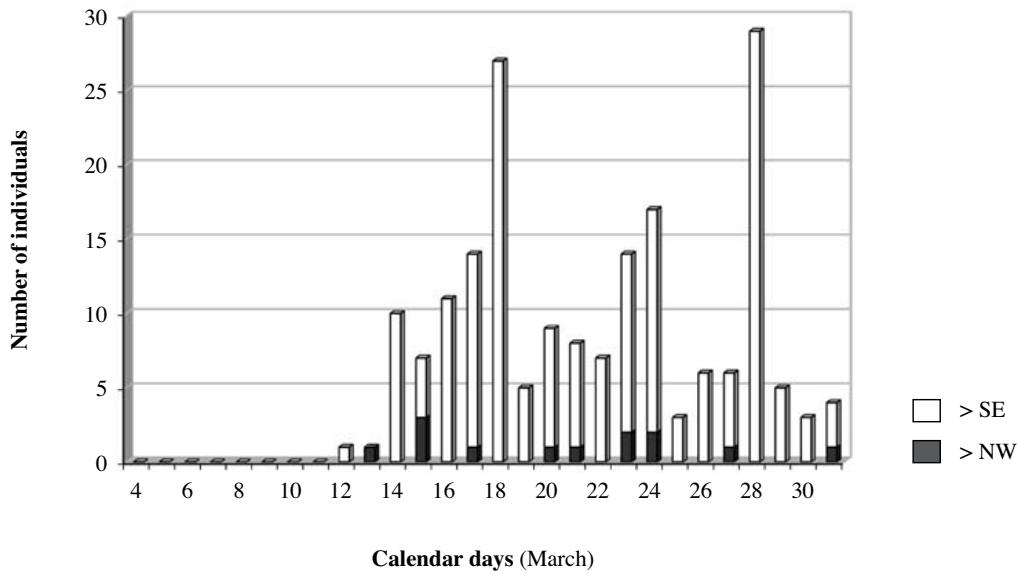


Figure 2. Daily records during March 2002-2011 of migrating black kite *Milvus migrans* at the Apuane Alps, heading NW and heading SE.

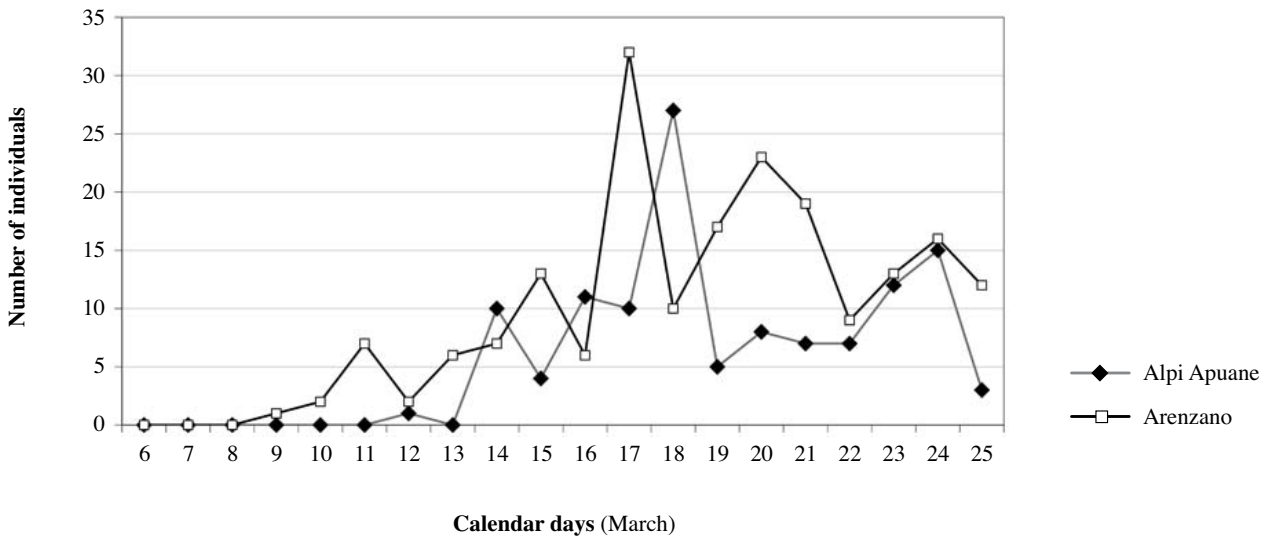


Figure 3. Comparison of the trend of the black kite *Milvus migrans* migration observed at Arenzano and Apuane Alps, over nine sample periods performed simultaneously in March 2003-2011. For the Apuane Alps only individuals heading SE are considered.

the booted eagle from Spain to Italy, where only a small percentage of the population acts differently from the majority and learnt a route to reach Sicily for wintering (Baghino *et al.* 2007, Premuda *et al.* 2007).

Acknowledgements – Many thanks to F. and M. Sava, F. and E. Viviani, A. Benvenuti, O. Janni, M. Franchini and the Comitato Ornitologico Toscano, the Apuane Alps Regional Park and its personnel (President G. Nardini, the Commander G. Speroni and the Guards G. A. Bertola, G. Cavalloni, N. Raffaelli), all

the participants in the Apuane Alps field camps and in particular E. Arcamone, A. Bartolini, A. Belosi, L. Bonanno, E. Bosi, M. Cacioli, M. Casani, A. Chines, A. Chiti Batelli, I. Corsi, B. Cursano, S. Cutini, P. D’Amelio, F. Dal Pino, A. Delle Sedie, R. Del’Orso, S. Donello, F. Gherardini, D. Giorgi, F. Lavezzi, M. Marcone, S. Milesi, G. Paesani, A. Peghini, F. and B. Perroud, L. Puglisi, A. Quaglierini, F. Roscelli, A. Sacchetti, T. Spenlehauer, S. Spinelli, F. Trafficante, L. Vanni, A. Vezzani. Concerning Arenzano acknowledgements are due to the Ente Parco del Beigua (the President D. Franchello, the Director M. Burlando and the biodiversity functionary A. Aluigi), LIPU-Birdlife Italia, the CFS Liguria, all the participants to the field camps and in particular to C. Rapetti, R. Pedemonte and G. Lovato.

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Associate editor: Yuri Albores-Barajas