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MOUNT CAPODARCO: A SURVEY ON THE MIGRATORY BEHAVIOUR OF ACCIPITRIFORMES ALONG THE ADRIATIC COAST OF CENTRAL ITALY

RIASSUNTO - Monte Capodarco: osservazioni sul comportamento migratorio degli Accipitriformi lungo la costa Adriatica dell'Italia centrale.

Introduction

During spring migration thousands of raptors were reported along the Adriatic coast of central Italy at the Conero Promontory and Mount S. Bartolo (GUSTIN *et alii*, 2002; GUSTIN & SORACE 2004; PANDOLFI & SONET, 2001). In particular, in this area, the greatest concentration of raptors occurs at Conero Promontory; at this site, differently from the other one, raptors tend to cross the Adriatic Sea to reach the coast of ex-Yugoslavia. However, in a recent paper, some authors suggested that counts of raptors at Conero Promontory could be affected by replication likewise at other coastal areas (AGOSTINI & PANUCCIO, 2003a). In fact, previous researches made on the flight behaviour of raptors in Europe, North Africa and North America, showed that it is very difficult to

avoid recount of migrants when they tend to undertake a water crossing (KERLINGER, 1984; 1985; AGOSTINI *et alii*, 1994a, 1994b; AGOSTINI & DUCHI, 1994; AGOSTINI & PANUCCIO, 2003b). Since thermals are almost absent over water, the sea crossing implies a long, powered flight with considerable expenditure of energy (KERLINGER, 1989) and for this reason, often raptors do not continue migrating, passing again in the study area, sometimes flying back from the sea.

Study area and methods

In this paper we report data collected in a new site situated along the Adriatic coast of central Italy, about 40 Km south of Conero, focusing on the flight behaviour of migrating raptors.

Observations were made from 1 to 17 May 2003 from 9:00 a.m. to 18:00 p.m. (solar time). We used a post (altitude approx. 200 m) situated on Mount Capodarco, 1 Km inland from the Adriatic coast. From this site the Conero Promontory was nearly always visible.

Results and discussion

We reported 713 raptors (Tab. I), mostly Honey Buzzards, *Pernis apivorus*, (N = 317; 44.3%), Marsh Harriers, *Circus aeruginosus*, (N = 268; 37.7%) and Montagu's Harriers, *Circus pygargus*, (N = 58; 8.1%). Honey Buzzards migrated mostly in flocks (88.9%), comprising on average 4,4 birds. In this species, a total of 222 migrated toward N, many of them passing very far inland, while 87 were seen heading toward SSW moving along the coast and coming apparently from the Conero Promontory. In 8 cases the direction was undetected. At least four flocks were seen soaring even for an hour in the study area, sometimes splitting, hesitating in front of the Adriatic coast and stopping migration. Because of these behaviours we cannot exclude replication of data in the sample of birds flying towards N. Our observations are consistent with the hypothesis that at least part of Honey Buzzards seen leaving the Conero promontory heading ESE (GUSTIN *et alii*, 2002) fly back towards the Italian Peninsula perhaps causing replication of data at that site (AGOSTINI & PANUCCIO, 2003a). In this picture, the analysis of the flocking behaviour of Honey Buzzards migrating along the Adriatic coast of Central Italy provides additional suggestions. The strong tendency of migrants to fly in flocks reported in our study agrees with all previous studies made on the migration of this species with the only exception of that made at the Conero Promontory (GUSTIN *et alii*, 2002; see also AGOSTINI & PANUCCIO, 2003a). In particular when comparing, using a contingency table, numbers of Honey Buzzards migrating alone with numbers of birds migrating in flocks recorded at Mount Capodarco, Mount S. Bartolo and at the Conero Promontory (AGOSTINI & PANUCCIO, 2003a; GUSTIN *et alii*, 2002), the proportion of solitary Honey Buzzards was significantly higher at the last site (Fig. 1) ($\chi^2 = 380.43$; d.f. = 2; $P < 0.001$). Recent observations made over Ustica showed that, in this species, the proportion of solitary birds is significantly higher among individuals stopping migration in front of the water barrier (AGOSTINI *et alii*, in press).

TABLE I - Raptors seen heading toward N from Mount Capodarco.

<i>Pernis apivorus</i>	222
<i>Circus aeruginosus</i>	245
<i>Circus pygargus</i>	58
<i>Accipiter nisus</i>	2
<i>Pandion haliaetus</i>	1
<i>Milvus migrans</i>	1
<i>Accipitriformes spp</i>	26
<i>Falco vespertinus</i>	17
<i>Falco subbuteo</i>	16
<i>Falco naumanni</i>	1
<i>Falco tinnunculus/naumanni</i>	6

Among Marsh Harriers, 245 individuals migrated towards N and only 4 (all juveniles) disappeared S, while in 19 cases it was impossible to follow the movements of birds, often seen hunting. Among identified birds (N = 220) we recorded 5 males, 25 females, 130 juveniles and 60 females/juveniles. Finally, among 58 Montagu's Harriers, no one was recorded flying S, while we identified 6 males, 20 females and 14 juveniles. The high proportion of *Circus* sp. observed (50.9 %, considering raptors seen heading towards N) could reflect a stronger tendency of harriers to move along the coast in this area being less dependent on soaring flight during migration (SPAAR & BRUDERER, 1997).

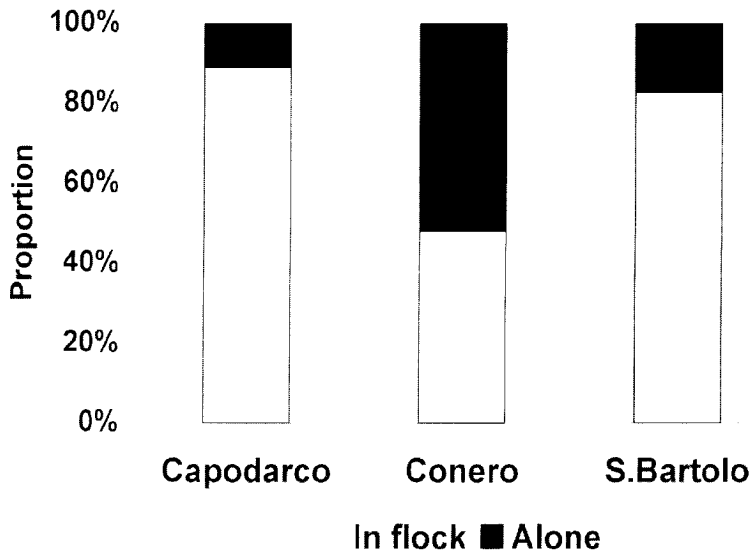


Fig. 1 - Proportion of honey buzzards migrating alone at Mount Capodarco (N = 317; this study), Conero Promontory (N = 1699; GUSTIN *et alii*, 2002) and Mount S. Bartolo (N = 783; PANDOLFI & SONET, 2001; AGOSTINI & PANUCCIO, 2003a).

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