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Short communications

Water-crossing tendency of juvenile Honey Buzzards (*Pernis apivorus*) during migration

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The Honey Buzzard is a summer resident in Europe wintering in west-central equatorial Africa (Cramp and Simmons 1980). This species mostly uses soaring flight over land during migration, although, having high aspect ratio (long) wings, it is able to cross large bodies of water (Kerlinger 1989). During their first migration in the Mediterranean basin, juvenile Honey Buzzards tend to migrate on a broader front than adults; while the latter cross the sea at its shorter points, the Straits of Gibraltar (Meyer *et al.* 2000, Schmid 2000), the Channel of Sicily (between Sicily and Tunisia via the island of Marettimo; Agostini *et al.* 2000) and the Bosphorus (Schmid 2000), concentrations of juvenile Honey Buzzards have been reported in many islands of the Mediterranean as Cabrera, Capri, Malta and Cyprus (Frost 1994, Agostini and Logozzo 1995, Rebassa 1995, Jonzén and Pettersson 1999). In the central Mediterranean area, adult Honey Buzzards tend to follow the Italian peninsula and after the crossing of the Straits of Messina (between southern continental Italy and Sicily) deviate westwards using the same spring route and concentrating over the island of Marettimo (Agostini *et al.* 2000). Only juveniles migrating in flocks of adults seem to be able to learn this route by information transmission (Fig. 1; Agostini *et al.* 1999). However, since juveniles of this species tend to migrate later than adults, moving about two weeks later (Kjellén 1992, Agostini and Logozzo 1995, Schmid 2000), groups containing individuals belonging to the two age classes are rarely recorded. In particular, in the Mediterranean basin, adults migrate between the end of August and the beginning of September, while juveniles concentrate their passage after the second week of this month (Agostini and Logozzo 1995, 1997, Schmid 2000). Juveniles passing in southern continental Italy in this period, concentrate along the slope of Mount Covello as the adults do, but they cross the sea at its widest point, between Sicily and Lybia (425 km), passing over Malta probably moving along a NE-SW axis genetically defined (Fig. 1; Agostini and Logozzo 1995). Since north of Mount Covello the peninsula has a NW-SE orientation, Honey Buzzards should deviate southeast during migration through central Italy. Along the western coast of central Italy hundreds of juvenile Honey Buzzards have been observed at the Circeo promontory (Fig. 1; Corbi *et al.* 1999). At this site, however, birds do not follow the peninsula but, apparently, cross the Tyrrhenian Sea moving towards western Sicily via Ponza, an island located about 30 km south of the promontory (Fig. 1). The aim of this study was to test the hypothesis that these birds reach Tunisia via western Sicily passing over the island of Marettimo (Agostini *et al.* 2000); this mountainous island should attract Honey Buzzards migrating across the Channel of Sicily.

Observations were made from 15 to 29 September 2000, the peak of the autumn migration of juvenile Honey Buzzards in the Mediterranean basin. Each day, observations were carried out from 9.00 h until dusk aided with telescope and binocular. The Circeo promontory is located in the southernmost point of the Pianura Pontina reaching 541 m. a.s.l. The observation post was located along its southern slope at the altitude of c. 400 m. This post was chosen to detect birds really undertaking water-crossing. Here no monitoring was made on 20 September because of heavy rainfalls. Marettimo is a mountainous island (12 km^2), about 30 km off western Sicily and 20 km west of the islands of Levanzo and Favignana, over which the greatest concentration of raptors through Italy occurs during post-reproductive movements (Agostini *et al.*

2000). This island is located at the narrowest point of the central Mediterranean, about 130 km NE of the Cap Bon promontory (Tunisia, Fig. 1). Monte Falcone is its highest relief, reaching 686 m. Up to now, at this site, no observations were carried out after mid September. The observation post was located at the altitude of c. 500 m. The Maltese Islands are situated about 90 km south of Sicily and 335 km north of Libya. Raptors concentrate along the cliffs on the western side of the Island of Malta (Beaman and Galea 1974). The observation post was situated in this area, on one of the highest points of the island (250 m a.s.l.). At the Circeo promontory a total of 500 Honey Buzzards was counted. During the 15 days of observation the migratory flow showed two bouts of movement lasting two days each with the second (21-22 September) including 46.7% of all Honey Buzzards counted (Fig. 2). In 182 (36%) cases it has been possible to age birds; of them 163 (89.6%) were juveniles and 19 (10.4%) adults. Nearly all adults were seen from 15 to 17 September. Honey Buzzards showed a strong tendency to undertake the water-crossing: they left the coast flying south, heading apparently towards western Sicily via the island of Ponza. Only 13 birds were seen flying back inland. About 90% of Honey Buzzards migrated in flocks; groups were comprised on average of 4.8 birds and 74% (N = 95) of them contained fewer than 5 individuals. Only one flock, recorded on 21 September, contained more than 20 individuals (87).

Over the island of Malta a total of 564 Honey Buzzards was counted with a maximum of 279 birds on 23 September. By comparing daily variations in the migratory flow with those of the Circeo promontory, it is possible to note a considerable correspondence between the two sites (Fig. 2). Among 456 birds aged (81%) in Malta not one adult has been reported. 48 (8.5%) birds migrated alone while on average groups were comprised of 5.9 individuals (N = 87). Also over Malta only one flock, recorded on 23 September, contained more than 20 individuals (50).

Over the island of Marettimo a total of 45 Honey Buzzards were counted; among 15 (33.3%) birds aged 13 (86.7%) were juveniles and two adults (13.3%).

The strong tendency to undertake the sea-crossing showed by juveniles Honey Buzzards at the Circeo promontory is surprising if compared to the behaviour of adults recorded at the Cap Bon promontory (Tunisia; Fig. 1) during spring migration (Agostini *et al.* 1994a, 1994b). There, once they reach the coast near the promontory, Honey Buzzards rarely undertake the crossing of the Channel of Sicily and, although motivated by reproduction, they hesitate along the coast being affected by wind, flock size, physiological conditions and, probably, previous bad experience during water crossing. Juveniles, during their first migration, do not have experience about the higher energetic cost of flight over water. Moreover, since some individuals probably belong to the population breeding in central Italy (Agostini and Logozzo

Figure 1. Study area and routes used by juvenile Honey Buzzards during the autumn migration on the central Mediterranean (sketched arrow: supposed route; doted arrow: only when migrating in flocks of adults. C = Circeo, P = Ponza, V = Ventotene, I = Ischia, Ca = Capri, MC = Mount Covello, U = Ustica, M = Marettimo, CB = Cap Bon).

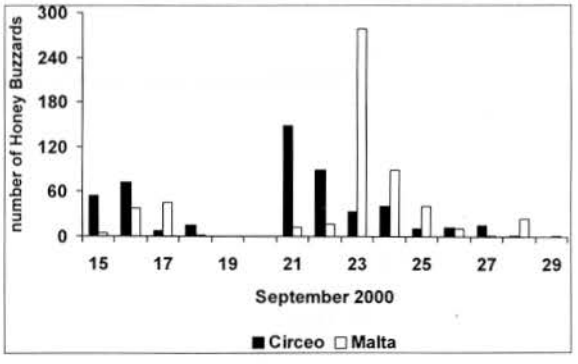

Figure 2. Occurrence of migrating Honey Buzzards between 15 and 29 September 2000 over the Circeo promontory and Malta.

1995), they are strong and fat being at the beginning of migration. However, the notable correspondence between data recorded at Circeo and over Malta, considering both the variations of the migratory flow and the size of flocks, do not agree with the hypothesis that juvenile Honey Buzzards cross the Tyrrhenian Sea reaching Tunisia via the island of Marettimo. A powered flight for some tens of km over water could be enough to change their decision; once they leave the Circeo promontory, they probably deviate east towards the Italian peninsula, perhaps via the islands of Ponza, Ventotene and Ischia, reaching Malta about two days later (Fig. 1). In southern continental Italy and southern Sicily they have no alternative to water-crossing. An alternative hypothesis concerning the existence of a direct route between Ponza and Tunisia seems to be, after this study, the least probable.

The small migratory flow observed over Marettimo could be related, perhaps via the island of Ustica, with a passage recorded over the island of Capri (Fig. 1; Jonzén and Pettersson 1999). On this island, located c. 5 km off Sorrentine peninsula and c. 110 km east-south-east of Ponza (Fig. 1), during autumn 1994 and 1995, Jonzén and Pettersson (1999) observed tens of juvenile Honey Buzzards. The median date of this passage was on 23 September. Most birds were seen leaving the island apparently towards Sicily, a few showing a very strong western component (> 215 degrees). However, if part of juveniles passing over Capri deviated eastwards over sea flying back to the mainland (Fig. 1), this would explain the greater number of individuals recorded over Malta during our study.

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Abstract - The autumn migration of juvenile Honey Buzzards was studied from 15 to 29 September 2000 at three sites of the central Mediterranean: the Circeo promontory (central Italy) and the islands of Marettimo (western Sicily) and Malta. The aim of this study was to test the hypothesis that juvenile Honey Buzzards leaving the Italian peninsula from the Circeo promontory, reach Tunisia via the island of Marettimo. At the Circeo promontory a total of 500 individuals was counted with the peak on 21 and 22 September. Juvenile buzzards showed a strong tendency to undertake the sea crossing flying south apparently towards western Sicily via the island of Ponza. 13 birds were seen flying back inland. On average flocks contained 4.8 birds and only one, observed on 21 September, contained more than 20 individuals (87). Over the island of Malta 564 Honey Buzzards were counted with a maximum of 279 on 23 September. There was a notable correspondence between data recorded in these two sites, both concerning the variations of the migratory flow and the size of flocks. Over Marettimo, a total of 45 buzzards were seen in the whole period. These results do not agree with the hypothesis tested in this study; on the contrary they seem to suggest that birds avoid the crossing of the Tyrrhenian Sea deviating east towards the Italian peninsula and passing over Malta about two days later.

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