FACTORS SHAPING PATHWAYS OF EUROPEAN HONEY-BUZZARDS (*PERNIS APIVORUS*) DURING SPRING MIGRATION IN THE CENTRAL MEDITERRANEAN BASIN

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During migration, European Honey-buzzards *Pernis apivorus* mostly use soaring flight, exploiting thermal currents over land. Because thermals are almost absent over water, travelling there requires more energetically-expensive powered flight (Kerlinger 1989) and European Honey-buzzards are reluctant to undertake long sea crossings. However, each spring, thousands of migrants wintering in west-central equatorial Africa cross the central Mediterranean to reach their breeding areas in central-eastern Europe (Cramp and Simmons 1980). During this sea crossing, the migrants concentrate at a narrowest point (approx. 150 km) leaving the African mainland from the Cap Bon Peninsula en route to western Sicily, and also later at the Straits of Messina (Agostini et al. 1994a, 1994b, Agostini and Logozzo 1998, Corso 2001, Agostini et al. 2006). Moreover, at least some of European Honey-buzzards crossing this Mediterranean area use alternative paths, reaching the Italian Peninsula directly via Ustica and Lipari Islands (Fig. 1; Panuccio et al. 2004, Agostini and Panuccio 2005, Agostini et al. 2005a). In doing so, they undertake a further water crossing flying over the Tyrrenhian Sea, bypassing the Straits of Messina. Unlike the Straits of Messina, where migrants are reported mostly during head winds (Agostini 1992), at Ustica, European Honey-buzzards move through during tailwinds, making a faster and energetically less-expensive flight over water (Agostini et al. 2005a). The aim of this study was to investigate factors shaping the pathways of European Honey-buzzards in the central Mediterranean basin during spring migration by simultaneous observations at four watch-sites, Maretimo, Pantelleria, Panarea (Lipari Islands) and the Straits of Messina (Sicilian side).

STUDY AREA AND METHODS

Observations, using binoculars and telescopes, were made between 25 April–20 May 2004, the peak of the spring migration of the European Honey-buzzard in the Mediterranean basin (Cramp and Simmons 1980). Maretimo is a small (12 km²) mountainous island, approximately 30 km from western Sicily and 20 km west of the islands of Levanzo and Favigñana. This island is located in the northern half of the Channel of Sicily, ca. 130 km NE of the Cap Bon Promontory (Tunisia, Fig. 1). Monte Falcone is its highest point, at 686 m. The observation station was located at an altitude of ca. 500 m. Pantelleria is a volcanic island (3.5 km²), located approximately 65 km NW from the Straits of Messina (Fig. 1). The observation station was at the island’s highest point, ca. 400 m a.s.l. Finally, at the Straits of Messina the observation station was located along the Sicilian slope, over the Peloritani Mountains at an altitude of ca. 500 m.

Previous studies made at the Cap Bon Promontory and at the islands of Maretimo, Ustica and Pantelleria, showed that European Honey-buzzards of the same flock tended to remain together in front of the water barrier because the first individuals making a decision (crossing or not) were followed by the others (Agostini et al. 1994a, 1994b, 2005a, 2005b). Thus, a flock-member did not act and orient independently. For this reason, in our statistical analysis, we considered the flock as sampling unit to avoid pseudoreplication of the data (Hurlbert 1984, see also Agostini et al. 2005a, 2005b). To investigate the circadian pattern of migration, each observation day was divided into three time periods: morning (0800–1159 H), midday (1200–1559 H) and afternoon (1600–2000 H, solar time). Hourly meteorological data from the two study areas (Pantelleria–Maretimo and Straits of Messina–Panarea) were recorded at the meteorological stations of Pantelleria and Reggio Calabria, respectively, and obtained at the Italian web site of the Weather Underground Inc. (www.ilmeteo.it/dati.htm). Observations were interrupted only because of rain and/or poor visibility. Contingency tables were used to test the influence of prevailing winds and of the time of the day on the migratory flow through the Channel of Sicily (Maretimo-Pantelleria) and eastern Sicily (Straits of Messina-Panarea).

RESULTS

Pantelleria–Maretimo. At these two sites, 325 flocks (216 at Pantelleria, 109 at Maretimo) and 54 solitary individuals (19 at Pantelleria, 35 at Maretimo) were re-