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DO MIGRATION COUNTS REFLECT POPULATION TRENDS? A CASE STUDY OF THE HONEY BUZZARD *PERNIS APIVORUS*

¿REFLEJAN LOS RECUENTOS MIGRATORIOS LAS TENDENCIAS POBLACIONALES? UN ESTUDIO CON EL ABEJERO EUROPEO *PERNIS APIVORUS*

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The honey buzzard *Pernis apivorus* is a summer resident in Europe that winters in west-central Equatorial Africa (Cramp and Simmons, 1980). During post-reproductive movements, adults migrate earlier than juveniles crossing the Mediterranean Sea en route to Africa between the last week of August and the first ten days of September (Agostini and Logozzo, 1995a; 1997; Schmid, 2000; Agostini, 2004). In the central Mediterranean region, adults follow the Italian Peninsula and after crossing the Straits of Messina deviate westwards crossing the sea at its narrowest point between western Sicily and the Cap Bon Peninsula with at least part of them concentrating over the islands of Marettimo and Pantelleria (Agostini and Logozzo, 1997; Agostini *et al.*, 2000; 2004; Panuccio *et al.*, 2005). During spring migration thousands of birds cross the Adriatic Sea en route to the former Yugoslavia (Gustin and Sorace, 2004; Premuda *et al.*, 2004) while, during autumn migration sporadic observations made over the Island of Lastovo (Croatia) between 24 August-3 September 2001, Schneider-Jacoby (2001) reported the passage of 221 honey buzzards en route to southern Italy (Fig.1). Recent data concerning populations of this species breeding in Europe reported notable increases just in the Balkans (BirdLife International, 2004), from which adult birds using this route are supposed to come (Agostini *et al.*, 2004). In particular, according to BirdLife International (2004) an average of 5810 pairs breed in Croatia, Slovenia, Serbia and Macedonia. Indeed, recent autumn surveys made in the Central Mediterranean showed an apparent increase in numbers of adults using this route: 4045 birds were counted at the two islands of the Sicilian Channel (Marettimo and Pantelleria; Agostini *et al.*, 2004) between 24 August and 12 September 2003, while at the Straits of Messina on average 5680 ± 521.4 (SD) migrants were recorded between 24 August and 10 September 2002-2004 (Panuccio *et al.*, 2005; Morabito and Repaci, *pers. obs.*). These counts differ from those made between 1993 and 1996 in a bottle-neck along the Calabrian Apennines about 100 km NE of the Straits of Messina (Fig. 1). There, Agostini and Logozzo (1995a; 1997; *pers. obs.*) reported 1015 ± 341.2 (SD) birds per season during the same period (24 August-12 September). As

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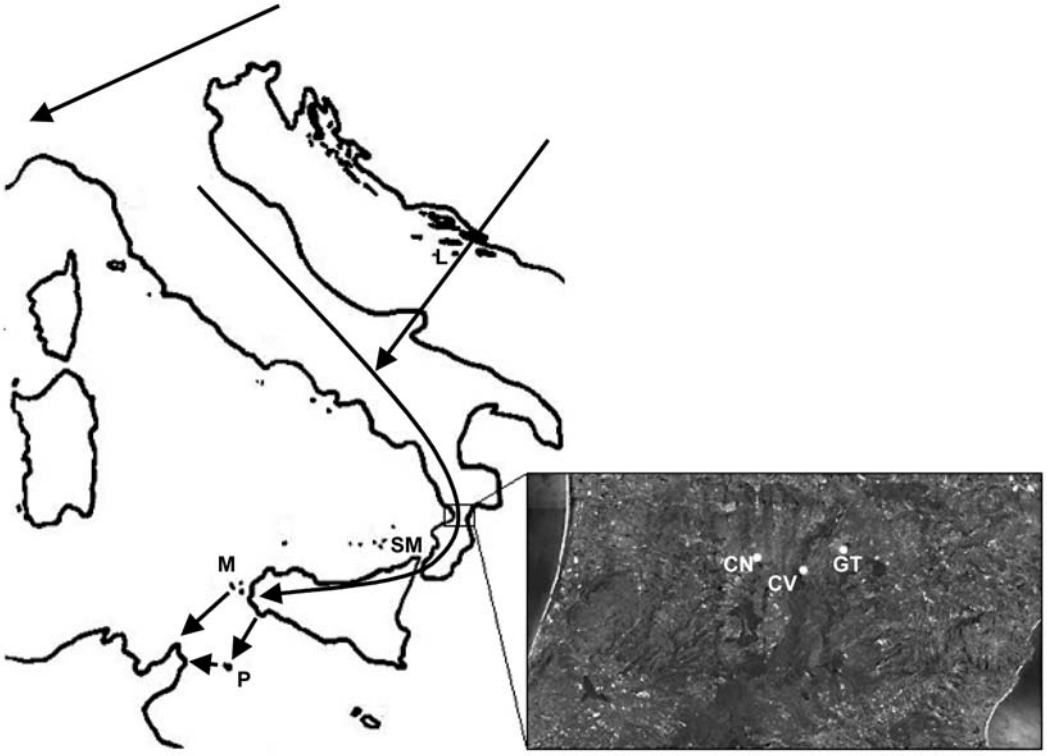

FIG. 1.—The study area, the Central Mediterranean region and directions of flight (arrows) of adult honey buzzards in autumn (CN = Mount Contessa, CV = Mount Covello, GT = Girifalco town, L = Lastovo, SM = Straits of Messina, M = Marettimo, P = Pantelleria).
[Mapa del área de estudio y de las direcciones de vuelo de los abejeros Europeos en otoño.]

counts of visible migration at watchsites where birds are funnelled into narrow corridors have been recognized as a useful tool for monitoring population trends of diurnal raptors (Bednarz *et al.*, 1990; Bildstein, 1998; Kjellén and Roos, 2000; Shirihai *et al*., 2000; Zalles and Bildstein, 2000; Yosef and Fornasari, 2004; Bensusan *et al*., 2007), the increase in the population of honey buzzards migrating across the Central Mediterranean during the last decade is verified through the presented observations in the Calabrian Apennines between 24 August and 12 September, 2005 and 2006.

The observation post used by Agostini and Logozzo (1995a, 1995b, 1997) was on the slope of Mount Covello at an altitude of approximately 700 m. In this area, the Apennines are initially interrupted to the south by the Sila Plateau and to the west and east by the Tyrrhenian and Ionian Seas. Directly south of this interruption lies a flat and hilly zone (Marcellinara Isthmus) including the Pesipe River valley separating Mount Covello centrally from Mount Contessa (distance less than 3 km) to the west. As a result, birds concentrate along the passage in the Pesipe Valley and often fly low to the ground (< 100 m) allowing for an accurate survey of the migration by direct visual observation. Two observers were used at the same post (38° 48' N; 16° 23' E), using telescopes

TABLE 1

Proportion of honey buzzards reported from the three observation posts during 2005 and 2006.
[Proporción de abejeros europeos registrados en los tres observatorios en los dos años de estudio.]

Year	Mount Contessa	Mount Covello	Girifalco town
2005	28	59	13
2006	30	58	12

and binoculars as in the previous study. To verify the proportion of migrants undetected from the post on Mount Covello, observations were also conducted using two posts along the western and eastern slopes of the Apennines on Mount Contessa (approx. 700 m a.s.l., 38° 48' N; 16° 22' E) and in the town of Girifalco (approx. 450 m a.s.l., 38°49' N; 16° 25' E), respectively. Each day between 08:00 and 18:00 h (solar time) observations were made simultaneously using the three posts. Observations were interrupted only due to rain. Because distances between observation posts were such that some overlap occurred, at the end of each day, data recorded at each post were compared to check and eliminate possible double counts according to time and location of the passage (see also Dovrat 1991, quoted by Shirihai *et al*. 2000).

A total of 3464 and 3983 honey buzzards were counted in 2005 and 2006, respectively. Of them, 2032 and 2292 were reported from Mount Covello during 2005 and 2006 respectively, whereas 1432 and 1691 birds, respectively, were seen exclusively from the post on Mount Contessa and the town of Girifalco in the two years; the proportion of birds seen in 2005 and 2006 from the three posts did not differ significantly (Table 1; contingency table: $\chi^2 = 3.27$, df = 2, $P > 0.05$). As in 1990s (Agostini and Logozzo 1995b), prevailing winds in the study area were lateral to the direction of migration (lateral winds = 304 hrs; other wind conditions = 87 hrs. Data obtained from the Lamezia Terme meteorological station at the web site www.ilmeteo.it/dati.htm). A previous study focusing on the honey buzzard migration in relation to weather, made using the post on Mount Covello, showed that counts of migrants were not significantly affected by crosswinds suggesting that these raptors are able to compensate their drift effect when migrating along the Calabrian Apennines (Agostini and Logozzo, 1995b). Although, during observations about 40 % of the honey buzzards passed as undetected from the post used in 1993-1996, the great difference between previous counts and that made in 2005 and 2006, taking into account only data from Mount Covello, confirms that a notable increase in the number of adults crossing the Central Mediterranean during post-reproductive movements has occurred in the last decade. A notable increase also was reported in northern Italy during autumn migration (Mezzavilla *et al*., 1998, 2002, 2003a, 2003b, 2004, 2005; Gargioni, 2005) and during spring migration at the Straits of Messina (Agostini, 2005). What could be the reason for such an increase?

Until the beginning of the 1990s, each spring thousands of adult honey buzzards fell victim to the guns at the Straits of Messina, mostly along its continental slope, where at least 2000 illegal hunting posts were used by poachers (Cortone and Mirabelli, 1984; Agostini *et al.*, 1994; Ferguson-Lees and Christie, 2001). Since 1984, international volunteers managed by the Italian League for the Protection of Birds

(LIPU) and foresters controlled the shooting (Giordano *et al.* 1998). As a result, especially in the last 10 years, shooting has decreased and today very few posts are used by poachers while a minority shoots from the roofs of their houses (Panuccio, 2005). Adult mortality has a great effect on populations of long-lived slow-reproducing species such as raptors (Newton, 1979). In this scenario, the Straits of Messina's slaughter quite possibly had a dramatic effect on breeding populations until the 1990s, and the notable recent increase among both migrant and breeding honey buzzards in the Central Mediterranean region could be the result of these protection efforts. It is interesting to note that, in contrast with these results, a decrease in honey buzzard numbers has been reported along the western flyway, both at Falsterbo (Kjellén and Roos, 2000) and at the Straits of Gibraltar (Bensusan *et al*., 2007), which coincides with the negative trend in breeding populations of Scandinavia (BirdLife International, 2004). Since these populations do not suffer from poaching activity, one explanation could be the habitat loss due to modern plantation forestry (Ahlén and Tjernberg, 1996 quoted by Kjellén and Roos, 2000). Meanwhile, no significant trend has been observed in the Middle East (Shirihai et al., 2000), in agreement with breeding data from Russia (BirdLife International, 2004).

As more than 3000 honey buzzards have been observed along the Calabrian Apennines during both 2005 and 2006, the area of Mount Covello and its surroundings should be included among the Important Bird Areas, according to the criteria B4.iv (Heath and Evans, 2000). In the future, constant monitoring at this site would be useful not only to assess population trends, but also to reduce the dramatic poaching on Malta (Sammut and Bonavia, 2004), where, mostly after mid September, marsh harriers *Circus aeruginosus* and juvenile honey buzzards migrating along the Calabrian Apennines (Agostini and Logozzo, 1995a; 1997; Agostini *et al*., 1999; 2003) still fall victim to poachers. It is suggested that monitoring on the Calabrian Apennines could improve the actions available to conservationists in Malta by highlighting in advance the variation of the migratory flow of these raptors. Moreover, given that the honey buzzard is very elusive during reproduction (Sergio and Penteriani, 2002), migration counts may serve as a more efficient and economical way to survey and monitor the species than attempting to do so in the breeding areas.

Resumen.—*Datos recientes sobre la población reproductora en Europa de* Pernis apivorus *indican que existe un incremento de sus poblaciones en el área del Mediterráneo central. Recuentos de aves migrantes en sitios donde éstas tienen que pasar por estrechos corredores han sido organizados como una de las herramientas útiles para el monitoreo de las poblaciones de rapaces diurnas. El objetivo del presente estudio fue la verificación de este incremento mediante la observación de aves durante su migración otoñal en los años 2005 y 2006 en el sur de la península italiana. Anteriores recuentos se hicieron en los mismos observatorios entre 1993 y 1996. Estos recuentos arrojaron un total de 1015 ± 341.2 (media ± DT) aves por año. En los dos años de estudio (2005 - 2006), se avistaron un total de 2032 y 2292 abejeros Europeos, respectivamente. En estos recuentos se utilizó la misma metodología que la utilizada en los años 1993 y 1996. Estos datos, en comparación con los obtenidos previamente y con las observaciones hechas en el estrecho de Messina y en las islas de Marettimo y Pantelleria en los años 2002 - 2004, confirman un incremento de migrantes y, potencialmente, de la población reproductora de esta especie en el ámbito del Mediterráneo central durante las últimas décadas.*

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