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Autumn migration of Accipitriformes through Italy en route to Africa

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Abstract - A survey on the autumn migration of Accipitriformes along the Calabrian Apennines (southern Italy) was carried out from 11 August to 10 October 1996. A total of 2385 raptors were counted, mostly Honey Buzzards *Pernis apivorus*, Marsh Harriers *Circus aeruginosus* and Black Kites *Milvus migrans*. Both adult and juvenile Black Kites and Marsh Harriers migrated in the same period, concentrating during the third 10 days of August and the first three weeks of September respectively. These species use different routes to cross the central Mediterranean: hundreds of Marsh Harriers concentrate over Malta while Black Kites cross the sea between Sicily and Tunisia. In the case of the Honey Buzzard, a partial overlap of migration periods of young and adults was observed during the first 10 days of September. Our observations suggest that at least part of Short-toed Eagles *Circaetus gallicus* breeding in central Italy do not cross the central Mediterranean. They probably cross the Mediterranean Sea at the Straits of Gibraltar, passing over the Ligurian Apennines (northwest Italy). This hypothesis suggests information transmission between adults (expert individuals) and young (inexpert individuals).

Introduction

During autumn migration across the central Mediterranean, a notable concentration of raptors, especially Accipitriformes, occurs on the Calabrian Apennines (southern Italy) where the distance between the Tyrrhenian and Jonian coasts is narrowest (approximately 30 km, Fig.1) (Agostini and Logozzo 1995a). Since 1992, at the Calabrian Apennines, observations have been made mostly on the Honey Buzzard *Pernis apivorus* (Agostini and Logozzo 1995b, c, Agostini *et al.* 1997). Adult Honey Buzzards were observed from the end of August to the beginning of September, and cross the central Mediterranean at its narrowest point, between Sicily and Tunisia, concentrating over the island of Marettimo (Fig.1); on that island about 900 individuals were counted from 27 August to 9 September 1997 (Agostini and Logozzo pers. obs.). Young individuals, in agreement with observations made at the Falsterbo peninsula, in Sweden (Kjellen 1992), migrate later, concentrating their passage over Malta. The Honey Buzzard is the only large soaring species commonly seen in Malta, where only few Short-toed Eagles *Circaetus gallicus* and Black Kites *Milvus migrans* are observed, although both species breed in Italy (Beaman and Galea 1974).

The aim of this study is to investigate the autumn migration of Accipitriformes across the central Mediterranean, through observations on the Calabrian Apennines.

Study area and methods

Observations were carried out from 11 August to 10 October 1996. On the Calabrian Apennines few birds were observed outside of this period (Agostini and Logozzo pers. obs.). We used two observation posts on the slopes of Mount Covello and Mount Contessa at an altitude of *c.* 700 m (Fig.1), but never at the same time. The valley of River Pesipe separates Mount Covello from Mount Contessa in the west. In this area the Apennines are interrupted by a level ground between the two reliefs and the Sila plateau to the north and the Tyrrhenian and the Jonian coasts to the west and the east. We divided the two months of observation into six 10-day periods, and concentrated on the migration of adults and juveniles of the species commonly observed. It was possible to determine the age of some birds, generally when they were very close (<150 m) overhead (Agostini and Logozzo 1995b). For each species, the total of adults and juveniles was estimated according to their proportions in the sample of identified individuals, following the method used by Kjellen in his study on the autumn

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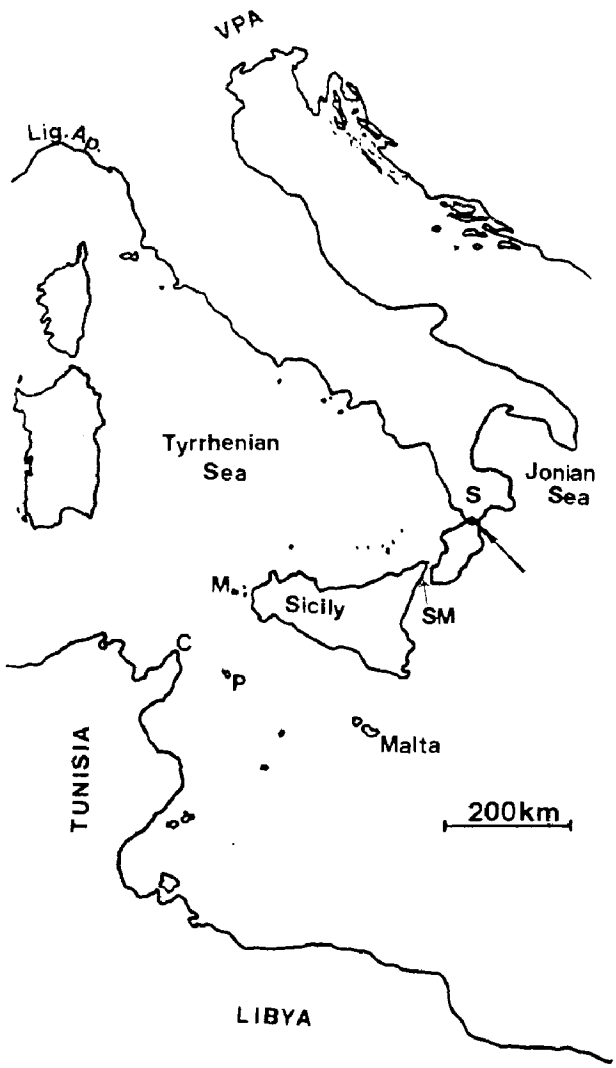

Fig. 1. Study area location (S = Sila plateau; C = Cap Bon; P = Pantelleria; M = Marettimo; SM = Straits of Messina; VPA = Venetian Pre-Alps).

migration of raptors at the Falsterbo peninsula (Sweden, 1992). The characters used in separating age were those given by Porter *et al.* (1981). Observations were made using 10x50 binoculars.

Results

A total of 2385 individuals were observed in 409 h. Because of the distance, in 182 cases it was impossible to identify the species. The most abundant species were the Honey Buzzard (1411, 64%), Marsh Harrier (460, 21%) and Black Kite (261, 12%). Moreover, we observed 41 Montagu's Harriers (*Circus pygargus*), 12 Sparrowhawks (*Accipiter nisus*), 5 Short-toed Eagles (*Circaetus gallicus*), 4 Ospreys (*Pandion haliaetus*), 3 Booted Eagles (*Hieraaetus pennatus*), 3 Egyptian Vultures (*Neophron percnopterus*), 2 Buzzards (*Buteo buteo*) and 1 Imperial Eagle (*Aquila heliaca*).

The migration of Honey Buzzards showed two peaks; the first occurred on three days from 30 August to 1 September, and the second also on three days from 5 to 7 September. The maximum number was recorded on 7 September when 247 Honey Buzzards were counted. During the first 10 days of September, a notable overlap in the migration periods of adults and juveniles occurred, while during the second and third 10 days of this month nearly all Honey Buzzards were young (Fig.2). When comparing the frequency of individuals belonging to the two age groups observed in 1993-1996 (considering the sample of identified birds), a significant difference resulted in the adults, and the proportion of juveniles was on average 25% (Table 1).

Most Marsh Harriers were observed during the first and second 10 days of September (Fig.3), with a peak of 114 individuals on 7 September. In 223 cases it was possible to observe their plumage; of these 64% were adults and 36% juveniles. Marsh Harriers and Black Kites belonging to the two age groups migrated in the same time (Figs.3 and 4). Black Kites were seen mostly during the last 10 days of August, and we recorded a flock of 79 individuals on 24 of August.

Discussion

The great difference between the counts of Honey Buzzards made on the Straits of Messina during spring and those made on the Calabrian Apennines, suggested that this route during the post-reproductive migration is used mostly by individuals breeding in central Italy (Agostini and Logozzo 1995b). By comparing the variations in the migratory flow observed on the Calabrian Apennines in 1996 with those recorded between 1992 and 1995 (Agostini and Logozzo 1995a, b, c, Agostini *et al.* 1997), a similar period of movement was observed from the end of August to the beginning of September. In contrast, the large number of adults observed during the last three years, is due to the passage of hundreds of birds at the end of the

Table 1. Young and adult Honey Buzzards identified on the Calabrian Apennines between 1993 and 1996.

	1993	1994	1995	1996	Chi-square
Honey Buzzards	895	1544	1095	1411	
Adults	149	294	197	287	64.6 P<0.01
Juveniles	69	85	67	70	2.8 n.s.

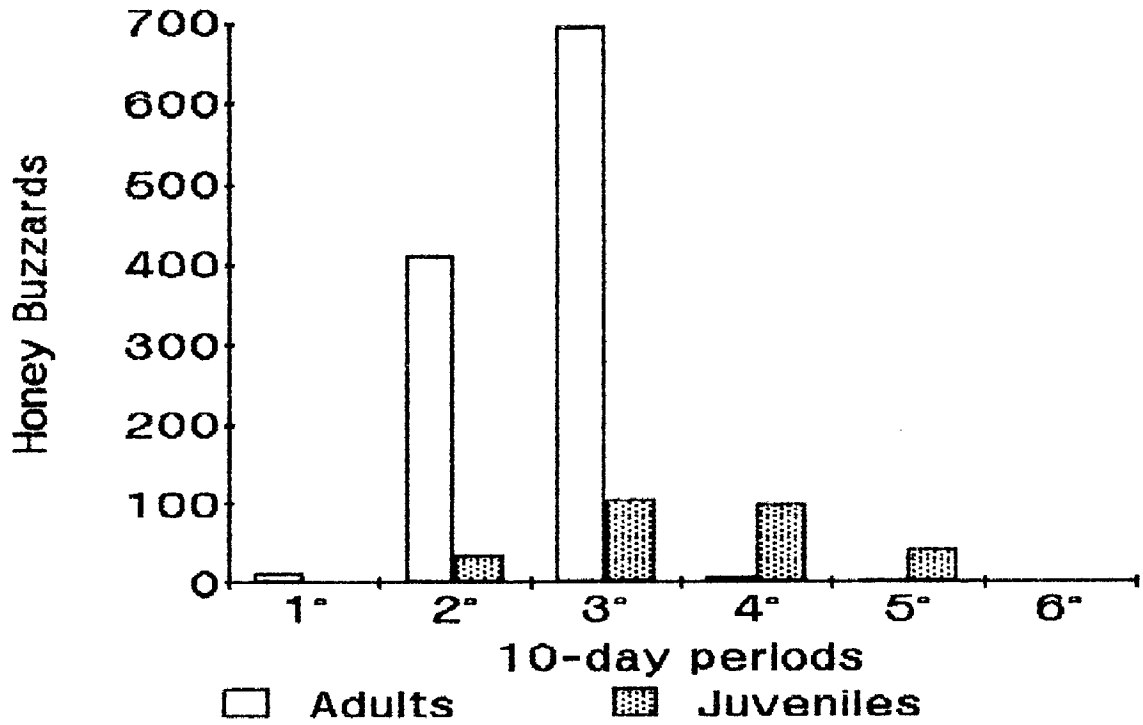

Fig. 2. Young and adult Honey Buzzards observed in six 10-day periods, according to their proportion among the identified individuals (adults n = 287, young n = 70).

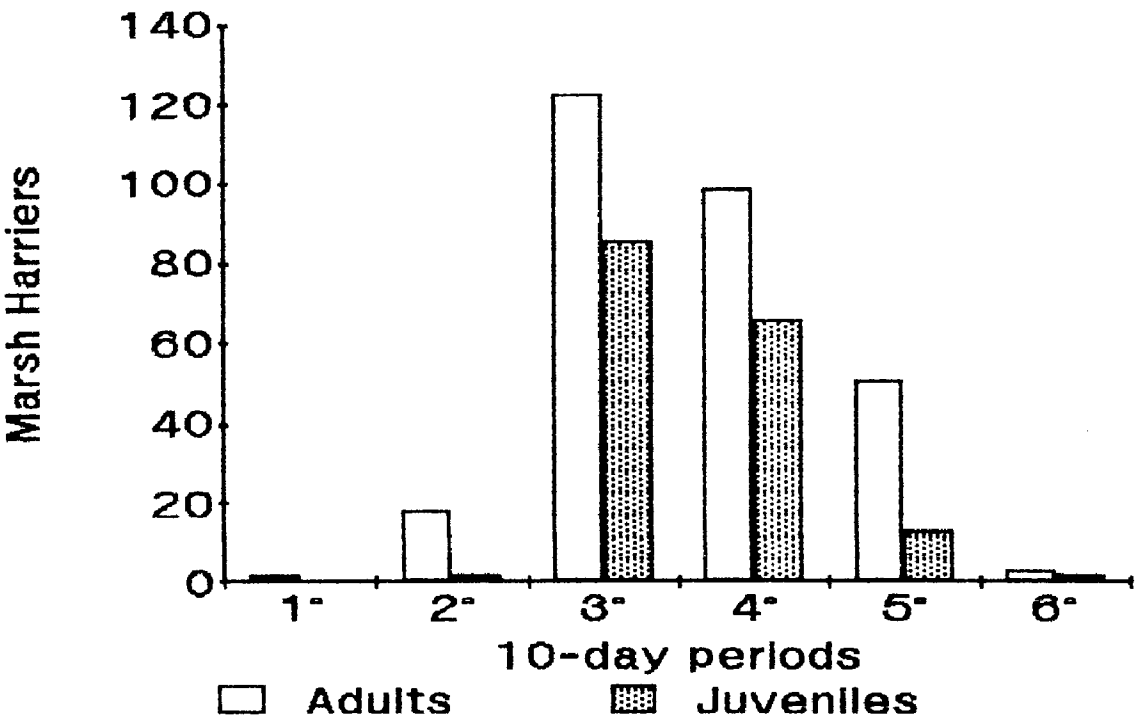

Fig. 3. Marsh Harriers (adults n = 142, young n = 81). Explanation as in Fig. 2.

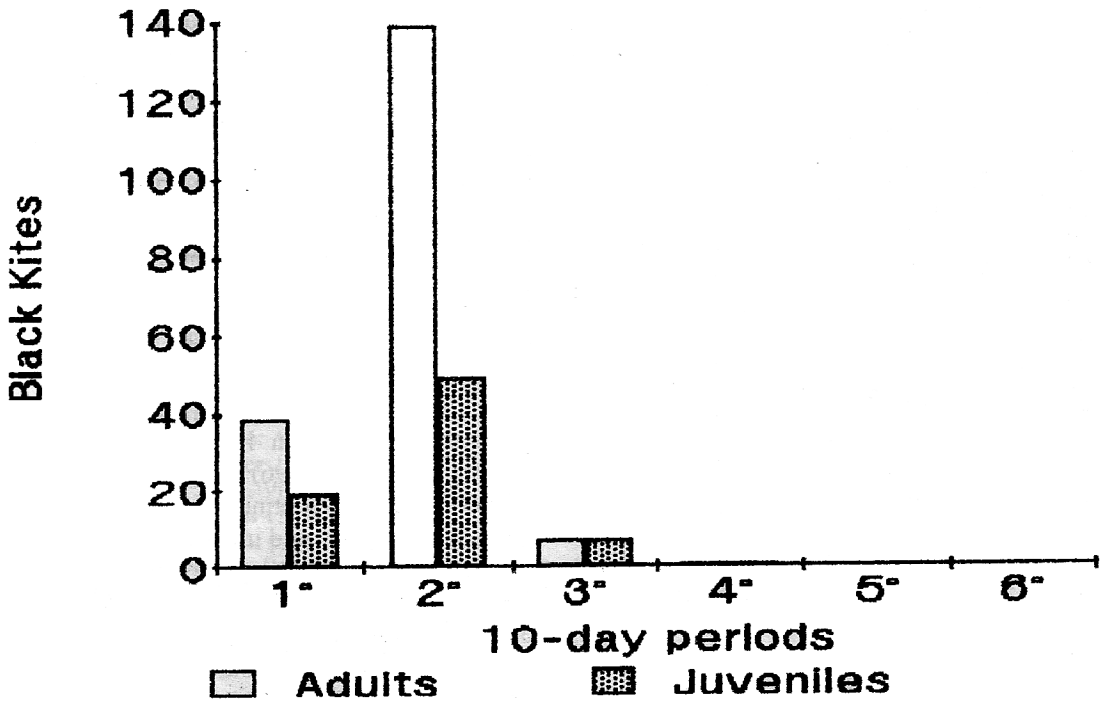

Fig. 4. Black Kites (adults n = 39, young n = 16). Explanation as in Fig. 2.

first week of September. In this period, especially in 1995 (Agostini *at al.* 1997), a significant overlap in the migration of adults and juveniles occurred. Studies made on the autumn migration of Honey Buzzards in northern Italy, suggested that there is a correlation with the movement across the Straits of Gibraltar (Mezzalira and Iapichino 1992). In the Venetian Pre-Alps (Fig.1) more than 2500 Honey Buzzards are observed passing every autumn; the peak occurred between 27 August and 2 September (Mezzalira 1991). Our observations suggest that part of the raptors migrating in this region crosses the central Mediterranean, perhaps when pushed south by unfavourable weather in the Alps, causing a "dragging" effect from juvenile individuals of central Italy. Because young observed on the Calabrian Apennines in this period do not move over Malta, it has been suggested that they are able to learn the shortest route to cross the central Mediterranean by following the adults (expert individuals) (Agostini *et al.* 1997). As in Malta, where mostly young individuals are seen (Agostini and Logozzo 1995b), a late peak is observed in Cyprus (Beaman and Galea 1974) and at the Gulf of Iskenderun, southern Turkey (Cameron *et al.* 1967). Perhaps also over these areas occurs a concentration of young Honey Buzzards. A broader front of migration during sea crossing, would also explain the low proportion of juveniles observed over the Falsterbo peninsula, Sweden (Kjellen 1992).

The Marsh Harrier is a summer resident in northern and eastern Europe, and individuals breeding in Finland cross the central Mediterranean (Gensbol 1984). These raptors have relatively long wings and, during migration, they frequently use powered flight and undertake crossings of large bodies of water (Kerlinger 1989). The number of Marsh Harriers counted on the Calabrian Appennines is similar to those observed in 1994 and 1995 over Malta (Colero *et al.* 1996), but are very different from those of a previous study made on the island between 1969 and 1973, when a maximum of only 80 individuals was observed per season (Beaman and Galea 1974). During this century the European numbers of Marsh Harriers have greatly decreased mainly because of the draining of wetlands, shooting and poisoning by pesticides. However our results are in agreement with the rapid increase which has occurred in northern Europe from 1975, probably because protection measures have been adopted (del Hoyo *et al.* 1994). Unfortunately these efforts could be frustrated by illegal hunting in Malta (Colero *et al.* 1996).

The small number of Black Kites reported, compared to the number breeding in Italy (Petretti 1992), suggests that mostly birds from southern Italy concentrate during autumn migration on the Calabrian Apennines. Black Kites cross the central Mediterranean between Sicily and Tunisia (Petretti 1992), and our observations suggest that juveniles learn this migratory route by

following the adults. On 26 August 1976, about 1200 individuals were counted at Rocca Busambra (western Sicily) and 400 together were seen over the island of Pantelleria on 6 September 1978 (Fig. 1, Galea and Massa 1985, Iapichino and Massa 1989). Moreover, during the last week of August 1997, about 2000 birds were counted on the island of Marettimo (Agostini and Logozzo pers. obs.). In contrast, few birds were observed over Malta (Beaman and Galea 1974). Because Black Kites are regularly seen along the coasts and islands of the Tyrrhenian Sea (Petretti 1992), we suggest that many birds breeding in central Italy carry out long, powered flight over the sea towards western Sicily, or migrate following coastal areas.

The Short-toed Eagle is migratory in Europe, wintering in tropical North Africa (Cramp and Simmons 1980). This species mostly uses soaring flight during migration and is therefore unlikely to undertake long sea crossings (Kerlinger 1989). The main route reported passes over the Straits of Gibraltar where most birds are observed during the second half of September (Finlayson 1992). The number breeding in Italy has been estimated as 380-415 pairs, and many of them breed along the Thyrrenian slope of the central Italy (Cattaneo and Petretti 1992). Our results agree with those of previous studies made in southern Italy both during autumn and spring migration (Agostini and Logozzo 1995a, 1995c, Agostini and Malara 1997), and seem to confirm that at least birds breeding in the northern part of central Italy cross the Straits of Gibraltar, passing over the Ligurian Apennines (Fig.1, northwest Italy; Agostini and Malara 1997). Because at the beginning this route, during autumn, involves a reversed direction of migration (towards north) compared to that genetically defined, our hypothesis would suggest information transmission and thus a contemporaneous migration of adult (expert individuals) and young (inexpert individuals) (Kerlinger 1989). This species is very scarce in Malta in autumn and is not recorded in spring (Beaman and Galea 1974, Sultana and Gauci 1982). In 1993, a flock of 29 individuals was observed on 22 November which, unfortunately, were shot (Colero pers. obs.). These irregular, late movements on the central Mediterranean and observations of wintering individuals in southern Sicily (Mascara 1985), suggest that the small population breeding in southern Italy carry out short migration towards that island, crossing the sea perhaps when it becomes too numerous in relation to food availability.

With the exception of the Montagu's Harrier, the counts of the other species made on the Calabrian Apennines are similar to those reported during the spring migration at the Straits of Messina (Agostini *et al.* 1995, Agostini and Malara 1997). In fact, although Montagu's Harriers tend to migrate on a broad front (Cramp and Simmons 1980), at the Straits of Messina in 1994, 287 birds crossed at its narrowest point. During the autumn migration a notable concentration of individuals occurs at the Straits of Gibraltar where, from 11 August to 9 October 1972, 1727 were counted (Cramp and Simmons 1980). During migration over land, perhaps this species is less inclined to follow mountain chains. However, another factor could have caused the great difference between spring and autumn counts in southern Italy. Montagu's Harriers, differently from the other long-distance migrants (Kjellen 1992), apparently do not suspend molt during autumn migration (Arroyo and King 1996). These raptors fly slowly and go hunting along the way (Brown 1976, Ali and Ripley 1978). Arroyo and King (1996) suggested that this strategy allows harriers to continue molting while migrating. Gaps in the wing would involve higher energetic costs during the long powered flight across the central Mediterranean: probably, many Montagu's Harriers observed at the Straits of Messina during spring migration, choose a different route during autumn, perhaps concentrating at the Straits of Gibraltar.

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Riassunto - Sono state effettuate osservazioni sulla migrazione autunnale dei rapaci Accipitriformi sull'Appennino calabrese, dalla seconda decade di agosto alla prima decade di ottobre del 1996. Sono stati osservati 2385 rapaci, prevalentemente Falchi pecchiaioli *Pernis apivorus*, Falchi di palude *Circus aeruginosus* e Nibbi bruni *Milvus migrans*. Le osservazioni sono state concentrate sulla migrazione degli adulti e dei giovani di queste specie. I Nibbi bruni ed i Falchi di palude appartenenti ai due gruppi di età migrarono nello stesso periodo, concentrandosi, rispettivamente, durante l'ultima decade di agosto e le prime tre settimane di settembre. Queste specie utilizzano due diverse rotte per attraversare il Mediterraneo centrale; centinaia di Falchi di palude si concentrano sull'isola di Malta, mentre i Nibbi bruni attraversano il mare nel suo punto più stretto, tra la Sicilia e la Tunisia. Nel caso del Falco pecchiaiolo, una parziale sovrapposizione dei periodi di migrazione degli adulti e dei giovani è stata rilevata durante la prima decade di settembre. Le nostre osservazioni suggeriscono che almeno parte della popolazione di Biancone *Circaetus gallicus* nidificante lungo il litorale tirrenico dell'Italia centrale, non utilizzi questa rotta migratoria. Probabilmente questi uccelli attraversano il Mediterraneo sullo Stretto di Gibilterra, passando sull'Appennino ligure. Questa ipotesi implicherebbe trasmissione delle informazioni tra gli adulti (individui esperti) ed i giovani (individui inesperti).

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