

AUTUMN MIGRATION OF MARSH HARRIERS
(*Circus aeruginosus*) ACROSS THE CENTRAL
MEDITERRANEAN IN 2002

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ABSTRACT

Agostini N., Coleiro Ch., Panuccio M. 2003. *Autumn migration of Marsh Harriers (Circus aeruginosus) across the Central Mediterranean in 2002*. Ring 25, 1-2: 47-52.

Observations on the autumn migration of the Marsh Harrier were made at two sites of the central Mediterranean: the Circeo promontory (central Italy) and the island of Malta. The aim was to investigate the passage of birds belonging to different sex and age classes. At the Circeo promontory a total of 787 individuals was counted, 37.5% of which were juveniles. Over the island of Malta the passage of 1535 Marsh Harriers was recorded with an evident peak comprising 906 birds on 13 September. At both sites males outnumbered females, mostly within the first half of September. Because, at least among adults, an imbalance towards females has been reported in the population wintering in central Europe, our results suggest that adult males could have a stronger tendency to migrate over a long distance, crossing the central Mediterranean area in large numbers. Whereas females, being larger than males, are able to tolerate colder temperatures and fast longer. Finally, our counts confirm the increase of the European population of the Marsh Harrier, which has occurred for the last three decades.

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Key words: migration, Marsh Harrier, *Circus aeruginosus*, Central Mediterranean

INTRODUCTION

The Marsh Harrier is a summer visitor in northern and eastern Europe (Cramp and Simmons 1980). Many individuals winter in central and southern Europe, while others cross the Mediterranean to winter in north-western and tropical Africa (Cramp and Simmons 1980). This species has relatively long wings and, for this reason, it is suited to use powered flight during migration, undertaking the crossing of large bodies of water (Kerlinger 1989). During autumn migration, individuals belonging to populations breeding in Finland, Poland, Ukraine, Belarus and Czech

Republic cross the Central Mediterranean (Cramp and Simmons 1980, Génsbøl 1992) apparently moving on a broad front along parallel NE-SW directions (Fig. 1). Observations were made during autumn migration of this species at two sites of this Mediterranean area, where notable concentrations of birds are recorded each season: the Circeo promontory (Corbi *et al.* 1999, Agostini *et al.* 2001) and the island of Malta (Coleiro *et al.* 1995, Agostini *et al.* 2001). The aim was to investigate the passage of birds belonging to different age and sex classes.

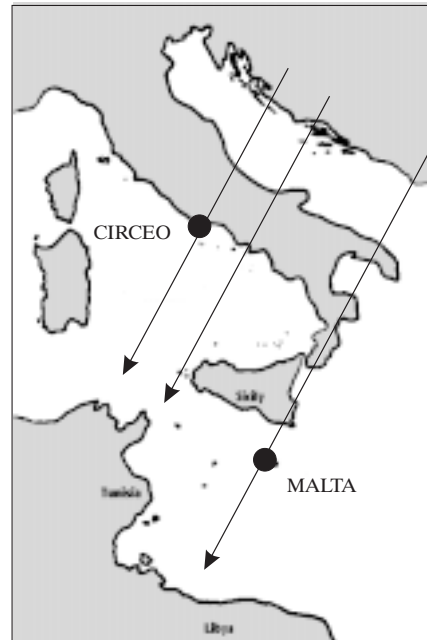


Fig. 1. Location of study sites (after Agostini *et al.* 2001, modified)

MATERIAL AND METHODS

Observations were made from 26 August to 30 September 2002, each day from 9.00 *a.m.* until the 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. (Fig. 1). The observation post was located in a military zone, on the roof of the ENAV building (altitude *ca* 400 m); this post was chosen to detect the direction of birds leaving the promontory. Among migrating birds, reversed movements are regularly observed in the coastal areas (Alerstam 1990, Meyer *et al.* 2000). These movements seem to be made in order to find suitable stop-over sites inland before crossing the sea (Alerstam 1990). It is interesting to note that near the Circeo promontory large wetlands are located. Thus, in our study, birds showing reversed migration were not considered to avoid pseudoreplication of data. Individuals roosting at the site were counted only when they were not observed in the following morning.

The Maltese Islands are situated about 90 km south of Sicily and 335 km north of Libya (Fig. 1). 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.). To avoid pseudoreplication of data, the post was not located at the Buskett Gardens, where raptors having stopped the migration concentrate to roost in late afternoon (Beaman and Galea 1974).

We divided 36 days of observation into nine four-day periods and concentrated on the migration of males, females and juveniles. It was possible to determine the age and sex of some birds by observation of their plumage (Forsman 1999). The totals of males, females and juveniles were derived at each site by multiplying their proportions in the sample of identified individuals in each period, following the method used by Kjellén (1992) in his study on the autumn migration of raptors at the Falsterbo peninsula (Sweden). To exclude a bias resulting from easier identification of adult males, the proportion of females and juveniles was estimated dividing unidentified individuals of the group female/juvenile between the two age groups according to their proportion among identified birds (see also Agostini 2001, Agostini and Logozzo 2000, Agostini *et al.* 2001).

RESULTS

At the Circeo promontory a total of 787 Marsh Harriers were counted peaking on 13 September, when 170 birds were recorded (Fig. 2). According to their proportions among aged individuals, it was possible to estimate the passage of 295 (37.5%) juveniles, while among adults males outnumbered females (Table 1; $\chi^2 = 4.88$, $df = 1$, $p < 0.05$) mostly during the first half of September (Fig. 3). Marsh Harriers showed a strong tendency to undertake the water-crossing – 424 birds left the coast flying SSW towards the Ponziane Islands, while only 19 individuals flew ESE along the coast. A total of 344 Marsh Harriers roosted at the site. Over the island of

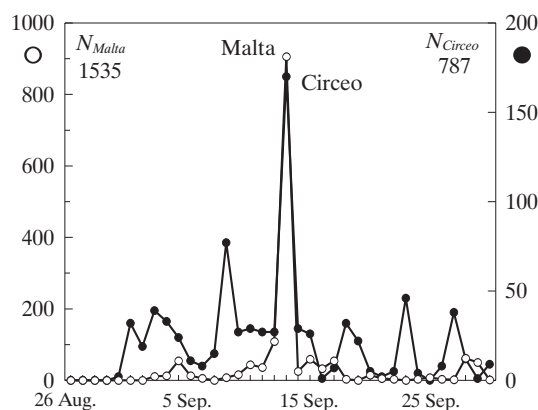


Fig. 2. The Marsh Harrier migration in 2002 on Malta and at the Circeo promontory

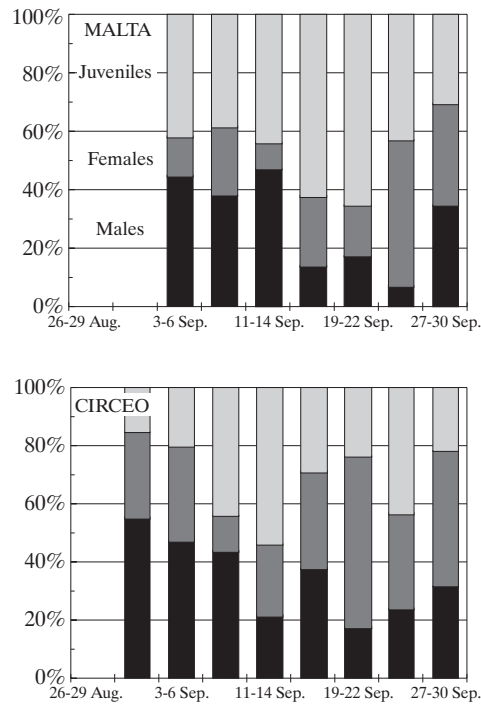


Fig. 3. Sex and age structure of the Marsh Harrier migration on Malta and at the Circeo promontory estimated according to proportion among identified individuals

Table 1
Juveniles, adult males and adult females estimated at the two sites according to their proportions among identified individuals during each 4-day period

Site	Juveniles	Adult males	Adult females
Circeo	295	271	221
Malta	684	639	212

Malta 1535 Marsh Harriers were seen with an evident peak comprising 906 birds on 13 September (Fig. 2). At this site, the passage of 684 juveniles was estimated and, among adults, the difference between males and females was significant ($\chi^2 = 213.25$, $df = 1$, $p < 0.0001$; Table 1). Although males outnumbered females both at the Circeo promontory and over Malta, among adults the proportion of females was significantly higher at the first site ($\chi^2 = 56.21$, $df = 1$, $p < 0.001$). Finally, at both sites juveniles and adults migrated in the same period (Fig. 3).

DISCUSSION

The higher proportion of males among adults recorded in our study agrees with previous observations made in southern continental Italy during autumn 1996

(Agostini and Logozzo 2000). In the Marsh Harrier, the occurrence of polygyny would suggest an imbalance towards females (Kjellén 1992, Clarke 1995, Agostini 2001), and in several populations of this species females do outnumber males (Simmons 2000). As mentioned above, many Marsh Harriers winter in Europe. In Italy the wintering population has been estimated at about 900 individuals (Baccetti *et al.* 2002). Observations made both in Italy and central Europe showed that nearly all wintering Marsh Harriers were adult females and juveniles (Chiavetta 1981, Clarke 1995, Agostini and Logozzo 2000). Female harriers, being larger than males both among adults and juveniles (Cramp and Simmons 1980), are able to capture larger prey and, probably, tolerate colder temperatures and fast longer (Newton 1979, Kerlinger 1989, Clarke 1995, Simmons 2000). For this reason, males, too small to compete with females for carrions and less able to kill waterfowls (Clarke 1995), could have a stronger tendency to migrate over a long distance after leaving their breeding areas (Agostini and Logozzo 2000). This would explain their higher proportion among adults migrating across the Central Mediterranean, especially during the first half of September. Moreover, this conclusion would suggest the prediction of an imbalance towards females also among juvenile Marsh Harriers wintering in Europe.

The count made over Malta in 2002 showed marked differences in comparison with those made at this site and in southern continental Italy in 1994 and 1996, when the passage of about 500 birds was recorded (Coleiro *et al.* 1995; Agostini and Logozzo 1997, 2000). The increase in number of migrating Marsh Harriers is confirmed also by observations made during September 2001 in southern continental Italy, when a total of 1202 birds was counted (Guglielmi *et al.* 2003). The difference becomes enormous if compared with counts made over the island between 1969 and 1974 when a maximum of only 80 birds was observed per season (Beaman and Galea 1974). During the first half of the last century, the European population of the Marsh Harrier dramatically decreased because of shooting and poisoning by pesticides and wetlands draining (del Hoyo *et al.* 1994, Clarke 1995). However, our results confirm the rapid increase, which has been recorded in Northern Europe since 1975, probably because of adopted protection measures (del Hoyo *et al.* 1994, Clarke 1995). Unfortunately, illegal hunting in Malta could frustrate these conservation efforts (Coleiro *et al.* 1995).

ACKNOWLEDGEMENTS

We wish to thank the Aeronautica Militare Italiana for the permission to entry in a military zone and the ENAV for the permission to use the observation post on the roof of its building.

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