

# The migration of Pallid Harrier across the central Mediterranean

with particular reference  
to the Strait of Messina

*Andrea Corso and Carmela Cardelli*



139. Second-calendar-year Pallid Harrier *Circus macrourus* migrating north at the Strait of Messina, southern Italy, May 2002. *Michael Sammut*

**P**allid Harriers *Circus macrourus* are medium- to long-distance migrants, breeding in eastern Europe and western and central Asia, from the Black Sea to the Yenisey River and Lake Baikal. Some birds winter in North Africa, the Balkans, Turkey and throughout the Middle East, but the majority spend the winter months in the Indian subcontinent (plus Myanmar) and sub-Saharan Africa (Snow & Perrins 1998; Ferguson-Lees &

Christie 2001, fig. 1). Although movements and migration through the Middle East are well-studied (e.g. Shirihai & Christie 1992, Shirihai *et al.* 2000, Alon *et al.* 2004), very little is known about their migration through the central Mediterranean yet, according to our data, this route may be as important as that through the Middle East. In this article, we present new data on the species' migration through this region.

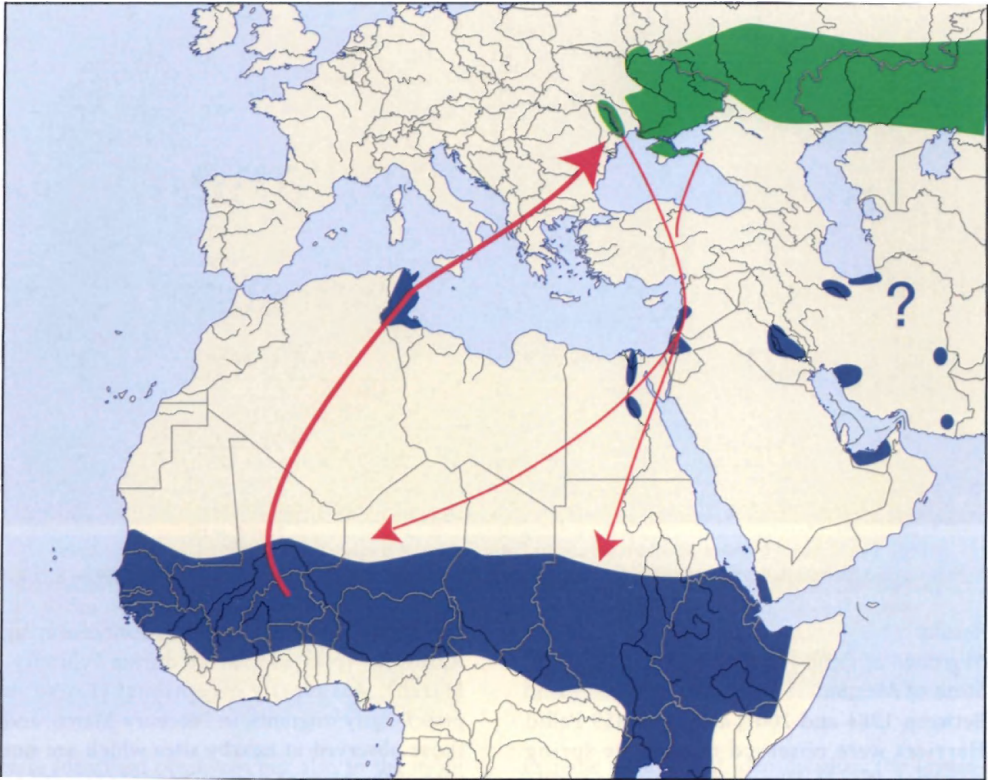


Fig. 1. Key migration routes between breeding (green) and wintering areas (blue) of Pallid Harriers *Circus macrourus*. Note the importance of the Middle East during autumn migration, and of a central Mediterranean route through Tunisia and southern Italy in the spring.

### The Strait of Messina survey

Since 1986 (CC)/1990 (AC) we have participated in the Strait of Messina survey, which was set up for the protection (from illegal shooting) and counting of migrant raptors and storks (see Corso 2001); this survey was initiated by the Lega Italiana Protezione Uccelli (LIPU) and organised and supported by the World Wide Fund for Nature (WWF) from 1990. From 1984 to 1995, data were collected irregularly during April-May (Giordano 1991; Zalles & Bildstein 2000; unpublished data), but from 1995 to 2001 inclusive we have both been permanent counters on this project, surveying raptors full-time during April and May; data in these years are from our counts, and those of other permanent counters (G. Chiofalo, A. Giordano, D. Ricciardi and L. Romano). All our data on Pallid Harriers from Messina come only from counts on the Sicilian side of the Strait (since no detailed comparison between Sicilian records and those from mainland Italy has yet been made, we do not include the latter).

From 1995 to 2001, observations at the Strait

of Messina were carried out daily, from 1st April to 27th or 28th May, from sunrise until dusk (approximately 7.00 am to 7.00 pm local time). Counts were made in all weather conditions (since raptor passage may be heavy even during strong rain and mist) but several observation points were used, the choice depending on wind strength and direction; all these are in the Messina town province and all but one are along the Peloritani Mountains, from 100 m up to 1,100 m above sea level. In strong southerly winds, an observation point at sea level (Capo Peloro, at the northeasternmost point of Sicily; plate 142) has been used. This site is good for counting migrating harriers, since they tend to use active flight and to follow the coastline more than other (larger) species, which are more dependent on the thermals which develop over land as it warms up.

Data from other sites in the central Mediterranean are chiefly from literature research and fellow raptor enthusiasts, but also include some personal observations; while those for the Middle East were derived entirely from the literature.

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140. The Strait of Messina, southern Italy, from Capo Peloro, at the northeastern tip of Sicily; this site is good for counting migrant harriers *Circus* crossing the Strait, especially in poor weather (see text).

## Results

### Migration of Pallid Harriers at the Strait of Messina

Between 1984 and 2001, a total of 459 Pallid Harriers were observed during the spring migration (fig. 2). During this period, our data show a marked increase in the numbers recorded in spring, with a mean 6.7 birds per year between 1984 and 1993, and a mean of 49.0 per year during 1994-2001. We estimate that the number of northbound Pallid Harriers has been 100+ per spring since about 1998;

spring 2001, when 132 were counted during April-May (plus another 20 during February-March), was clearly exceptional (Corso in prep.). Early migrants, in February-March, and those observed at nearby sites which are not part of the Messina project, are not included in fig. 2, so the true numbers using this flyway are clearly greater than fig. 2 suggests.

The increase shown may be due in part to better knowledge of the field identification of small harriers in recent years, which means a greater proportion of females and immatures

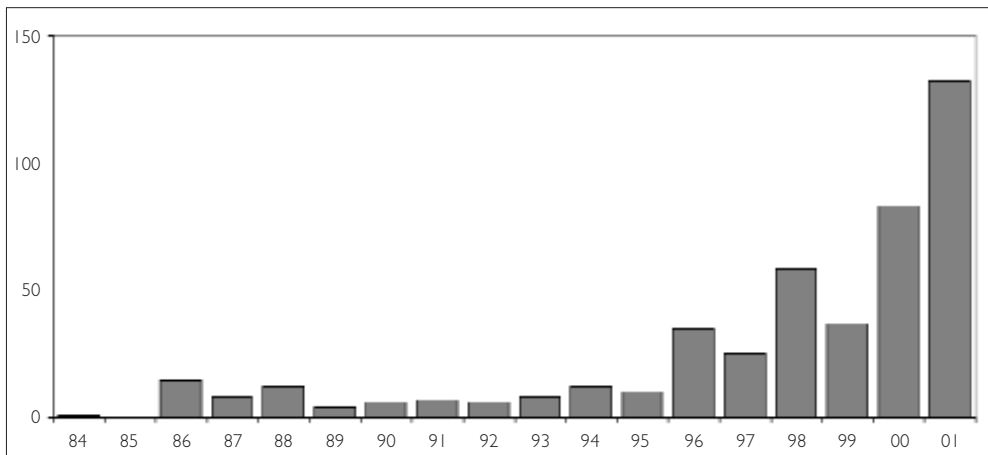
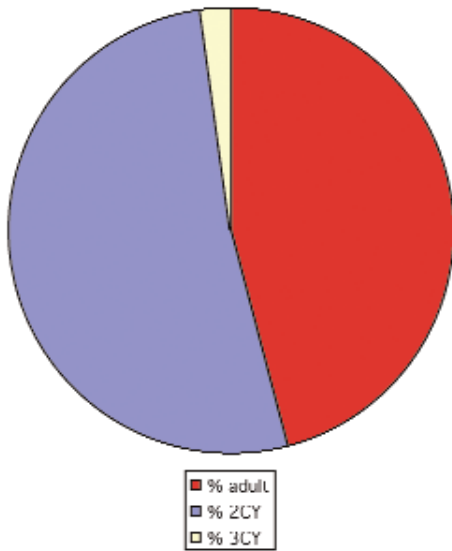
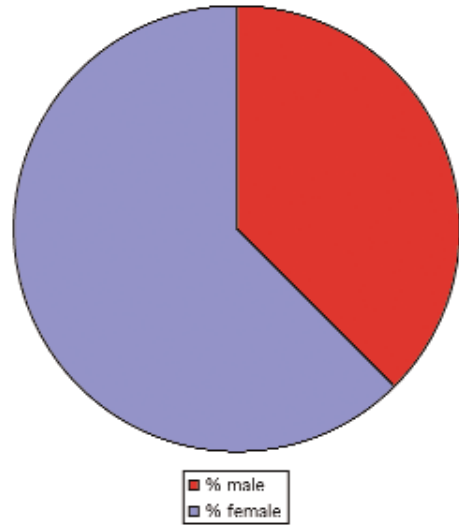


Fig. 2. Numbers (total) of Pallid Harriers *Circus macrourus* recorded in spring (April and May), Strait of Messina, southern Italy, 1984-2001. A grand total of 459 individuals was recorded in these 18 years (mean = 25.5, range: 0-132). During 1998-2001, counts were also made in February-March (Cardelli & Corso in prep.) but these are not included in fig. 2. Furthermore, in 1998, 45+ Pallid Harriers were recorded from a site close to our study area (see text); these are also not included here.



**Fig. 3.** The age distribution of Pallid Harriers *Circus macrourus* recorded in spring (April and May), Strait of Messina, southern Italy, 1997-2000 (n=203). Note that % 3CY refers to males only as 3CY females could not be safely distinguished from older females and so have been included in the % adult total.



**Fig. 4.** The proportion of males and females among adult (third-calendar-year or older) Pallid Harriers *Circus macrourus* recorded in spring (April and May), Strait of Messina, southern Italy, 1997-2001 (n=160).

were identified positively, but also to the more thorough and systematic survey protocol in later years. Indeed, an increase in numbers has also been shown by other migrating raptors (Corso 2001). Nonetheless, looking simply at the period 1996-2001, when survey effort and identification expertise would have been fairly constant, a clear increase in numbers is still evident (fig. 2), suggesting that our data reflect a genuine rise in numbers.

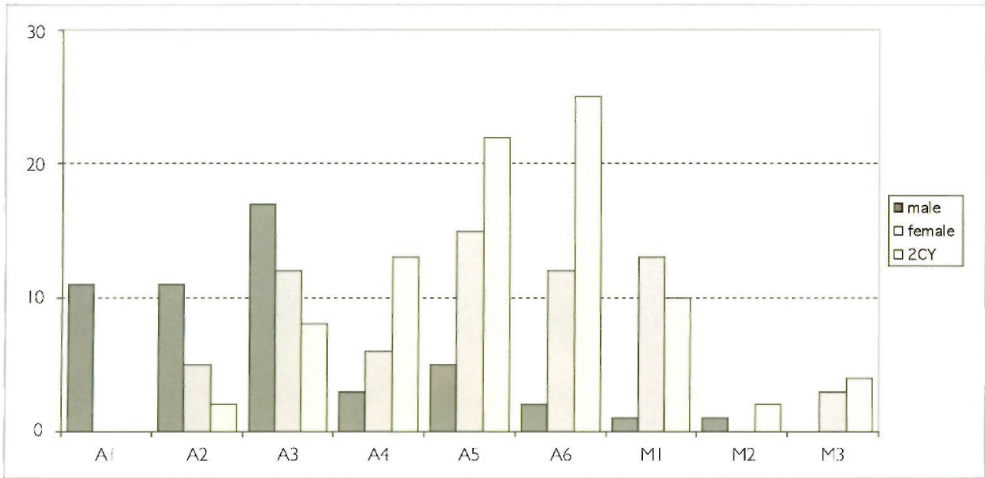
Detailed records of the age and sex composition of migrating Pallid Harriers were made during 1997-2001 (figs. 3 & 4; table 1). In this period, we observed 335 birds, of which 60 (17.9%) were adult males, 100 (29.9%) were adult females and 175 (52.2%) were second-calendar-year (2CY) birds. Of the 60 adult males, only seven (11.7%) were identified as being in their third-calendar-year (3CY). Because of the

extreme difficulty of identification, the separation of 3CY females from older females was not attempted. In terms of the sex ratio, 37.5% of the adults were males and 62.5% were females. Juveniles were sometimes sexed using iris colour (exceptionally!) or by plumage characteristics/wing shape, but this is not considered further here. A detailed breakdown of the age/sex composition in each year is given in table 1.

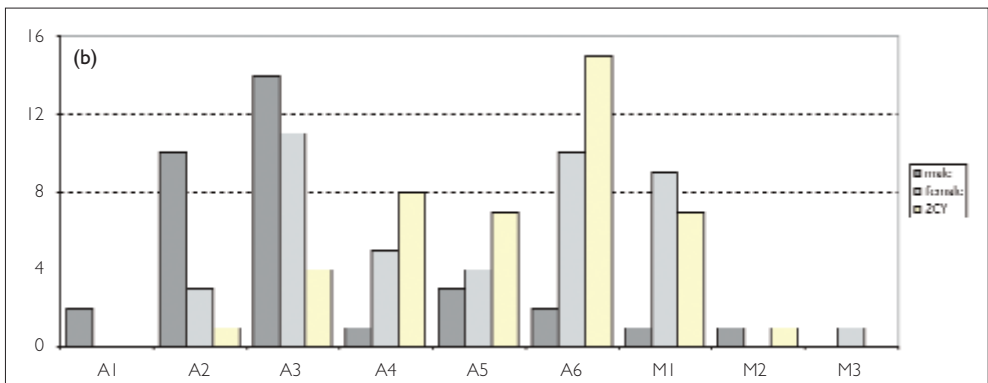
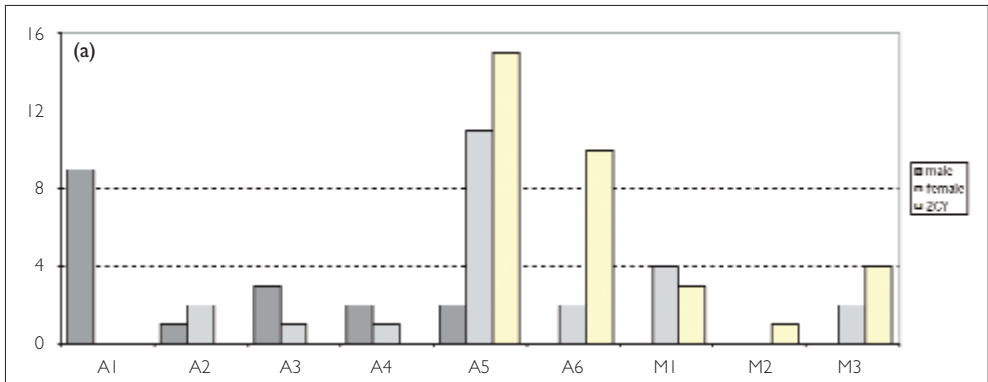
The timing of migration of different age/sex classes in 1997-2000 is shown in fig. 5. This shows clearly that, in spring, males migrate earlier than females, while adults tend to migrate earlier than 2CY birds. Similar findings have been reported for other harriers (Gustin & Pizzari 1998) and raptors (e.g. Shirihai & Christie 1992, Yosef 1996). There is also some variation in timing between years. For example,

**Table 1.** Migrant Pallid Harriers *Circus macrourus* recorded in spring (April and May), Strait of Messina, southern Italy: percentage of males, females and second-calendar-year birds in each year, 1997-2001.

	Male	Female	2CY	n
1997	52	20	28	25
1998	7	31	62	58
1999	13	41	46	37
2000	35	34	31	83
2001	7	26	67	132



**Fig. 5.** Migrant Pallid Harriers *Circus macrourus* recorded in April and May, Strait of Messina, southern Italy, 1997-2000: males, females and second-calendar-year (2CY) birds counted per five-day period (A1, A2, A3, etc.). These figures show that the peak passage of males was in the third five-day period in April, while counts of females peaked later in April, in the fifth such period. Numbers of second-calendar-year birds were highest in late April. In summary, 96% of males recorded were in April (n=49); 75% of females (n=50) were in April, with 25% (n=16) in May; and 81% (n=70) of juveniles passed through in April and 19% (n=16) in May.



**Fig. 6.** Migrant Pallid Harriers *Circus macrourus* recorded in spring (April and May), Strait of Messina, southern Italy: males, females and second-calendar-year birds counted per five-day period in (a) 1997-98, and (b) 1999-2000.



compare the results for 1997-98 with those for 1999-2000 (fig. 6); these clearly show that adult males were migrating later in the latter two-year period than in the former, although the pattern for females and 2CYs is less clear-cut. A similar delay in migration in 1999-2000 was noted in several other raptor species (Cardelli & Corso in prep.).

### *Migration elsewhere in the central Mediterranean*

In Sicily, away from the Strait of Messina, Pallid Harrier is a scarce but regular migrant, most often recorded in the east of the island and along the south coast. In fact, on the island of Marettimo, off the west coast of Sicily, none was observed during a survey in spring 1998 (Agostini & Logozzo 1998), although one or two have been recorded here during casual observations in other years (Panuccio *et al.* in prep.). On the island of Ustica, off northern Sicily, 44 were counted between 22nd March and 20th May 2002 (Agostini pers. comm.). In general, Pallid Harriers migrate on a broad front through Sicily between March and May, so that sightings away from our standard observation sites for the Messina survey are not infrequent. In particular, at Forza d'Agrò, to the south of the Strait, over 45 Pallid Harriers (some males, but mostly 2CY birds) were observed on 20th April 1998 (D. & I. van den Velde pers. comm.), and these were not recorded by the Messina survey. Away from regular count sites, 2001 was again a record year.

Few Pallid Harriers migrate through Sicily in autumn. There is no organised survey at the Strait of Messina, but casual observations reveal up to five individuals per year between late August and late September, most (c. 90%) of these being juveniles (Cardelli unpublished data). None was counted at Marettimo Island in autumn in 1997-2000 (Agostini *et al.* 2000; Agostini pers. comm.). At various sites in Siracusa (southeast Sicily), typically up to five individuals are seen each autumn, again predominantly juveniles (Corso pers. obs.), and occasionally one or two overwinter (Corso & Iapichino 1998).

In central-southern Italy, Pallid Harrier is also a regular migrant, though much less abundant than at the Strait of Messina. The highest counts are from Capo d'Otranto, in southeast Puglia (fig. 7), where 72 were counted between 10th March and 19th May 1989 (Gustin &

Pizzari 1998). Of these, 44 (61%) were females, 3 (4%) were males and 25 (35%) were 2CY birds; all males were seen in March, 63% of females were seen in April and 37% in May, while 96% of 2CY birds passed through in May (Gustin & Pizzari 1998). Some 20-40 individuals have been counted annually between March and May in recent years, with 40 in spring 2001 (Mellone, Premuda, Gustin & Catoni pers. comm.). This site is the easternmost point on the Italian coast, and may be used as a 'springboard' by raptors crossing the sea to the east (fig. 7). We presume that many of the Pallid Harriers crossing the Strait of Messina pass through this area en route to eastern Europe and Russia or Turkey. Mt Gargano, in northern Puglia, may also act as a springboard (there have been only occasional observations here), while a third site is Mt Conero (near Ancona, Marche region) in central Italy (fig. 7). Counts here are typically much lower than at Capo d'Otranto, and probably only a small percentage of the harriers migrating through Messina reach as far north as Mt Conero. Around 10-15 birds are estimated to use this flyway each spring (although a record count, of 33 individuals, was made in 2002; Borioni pers. comm.), most of which are adult males. This may mean that females/2CY birds have not been identified on migration, and that true passage is greater than suspected; or that the males are heading for northernmost breeding grounds, to which few immatures travel. Farther north, Pallid Harrier is an irregular migrant, and in most of northern Italy it is a vagrant. In autumn, the situation is similar to that in the south, with very few records each year.

Migrant Pallid Harriers passing Cap Bon, in northeast Tunisia, are surely the same as those using the Strait of Messina flyway (fig. 7). There are no regular surveys here, but (for example) 17 were counted between 26th March and 14th April 1974 (Thiollay 1975), 15 in roughly the same period in 1985 (Gultier unpublished data) and five on 25th March 1987 (Azafaf unpublished data). During a three-year spring survey at Cap Bon, four were counted in 1990, seven in 1991 and five in 1992 (Kisling *et al.* 1994), the timing of which fit well with Messina records in the same years. At El Haouaria, on the north side of Cap Bon, 189 Pallid Harriers were ringed between 1953 and 1966, of which seven were subsequently recovered in Italy, and 12 in

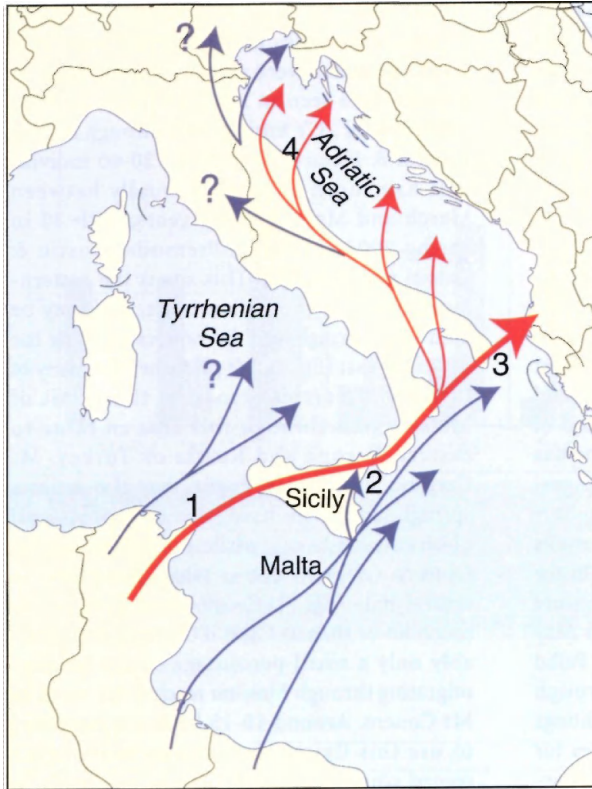


Fig. 7. Spring migration flyways of Pallid Harriers *Circus macrourus* across the central Mediterranean. The main flyways are in red, the thicker lines indicating the main routes. Secondary flyways are marked in blue. Most of the birds leave Africa from northern Tunisia (note the significance of Cap Bon (1)), pass over the Strait of Messina (2) and continue north and east from there (note the importance of Capo d'Otranto (3)). Smaller numbers of Pallid Harriers cross the Adriatic Sea farther north along the Italian coast, most of them from Mt Conero (4); while a few continue farther north still, or even use a route along the Tyrrhenian Sea.

eastern Europe (Bortoli 1967). Of these, three were recovered in Sicily, as follows (ringing date/recovery date/recovery location): (i) adult, 8th April 1955/12th April 1955/Catania, south-east Sicily; (ii) 8th April 1955/8th November 1957/Bagheria, northwest Sicily; and (iii) 7th April 1963/31st March 1967/Catania (Iapichino & Massa 1989). The other four recovered in Italy were at the Strait of Messina, on the Calabrian side, during spring migration (Bendini 1983). The numbers ringed at Cap Bon suggest that regular passage is probably much greater than limited observational data show, perhaps similar to that at Messina; it may also mean that the wintering population in Tunisia is greater than presently realised.

There are few records from Malta, which

might be assumed to be a natural stepping stone between Tunisia and Sicily: six were counted during March-May 2000, four in the autumns of 1990-95 and none in the autumns of 1996-2000. Nonetheless, and following a recurring theme, there were record counts from Malta in 2001 and 2002, with up to nine birds in spring and up to five in autumn (Sammuto, Montalto & Bonavia pers. comm.).

#### Migration in the Middle East

In Israel, the maximum spring count at Eilat, southern Israel, was 113 in 1985 (Shirihai & Christie 1992), although the peak day count was 38 on 3rd April 1983 (28 males, 10 females). Typically, 2CY birds pass in the second half of April, later than adults. In fact, most of the birds migrating through Israel in spring are adults (Shirihai & Christie 1992); for example, in spring 1994, 57 were counted, all of which were adults (Yosef 1996). The species is scarcer in autumn at Eilat, but there are high counts farther north, from the Northern Valleys/Kfar Qassem surveys (see Alon *et al.* 2004), probably the highest for the Western Palearctic: a mean of 45 per year were recorded from 1990 to 1999, including an exceptional 129 in 1994 (Alon *et al.* 2004). The 1994 record stood until autumn 2003, when fully

137 individuals were counted (Y. Perlman pers. comm.).

Significant numbers have also been recorded in Jordan; for example, 15 were observed on 29th-30th September 1994 at Ghadir Burqu' (Andrews 1996), and 164 were logged from 24th September to 20th October at the same site in 1998 (Shirihai *et al.* 2000). In the Red Sea, at the Bab el Mandab, 11 birds (three males) were recorded in autumn 1985 and 67 (15 males) in 1987 (Welch & Welch 1988). At Borçka/Arhavi, northeast Pontics, Turkey, 133 were counted in autumn 1976 (Andrews *et al.* 1977) but only 11 in spring 1994 (Shirihai *et al.* 2000), while at Belen Pass, southern Turkey, four were counted in autumn 1976 (Sutherland & Brooks 1981). At the Bosphorus, where high counts would



Nicolantonio Agostini

141. Male Pallid Harrier *Circus macrourus*, Ustica, off northern Sicily, date unknown.

perhaps be expected, surprisingly few have been recorded, with just sporadic, single-figure records (Beaman 1973; Beaman & Jacobsen 1974; M. Ozen pers. comm.).

Apart from the spring counts at Eilat, records of Pallid Harriers passing through the Middle East in spring are not common, and the bulk of the records are in autumn – the reverse of the situation in the central Mediterranean.

### Discussion

The Strait of Messina is the most important European spring migration flyway for Pallid Harrier, and among the most important in the entire Western Palearctic. At this site, the numbers counted in spring have increased in recent years, and the proportion of adults in the migrant population counted has also increased. Generally speaking, the proportion of young birds is an indicator of breeding success and the general health of a population. A similar decline in the proportion of migrant juvenile Steppe Eagles, a species with a comparable breeding range, has been registered in Israel (Shirihai *et al.* 2000) and perhaps similar factors may be affecting these two species. Nonetheless, in 2000-02, record numbers were recorded in several European countries, with a high proportion of juveniles (see table 1), suggesting that the West Palearctic population as a whole is currently vibrant.

There appears to be a clear difference in the age profile of birds migrating through the central Mediterranean in spring compared with those moving through the Middle East. The proportion of 2CY birds at the Strait of Messina

is relatively high (52.2% overall, 1997-2001), much higher than that at Eilat, where most of the birds are adults and few immatures are recorded (Shirihai & Christie 1992; Yosef 1996). This may reflect differences on the wintering grounds. For example, there seem to be clear differences in the age ratio of wintering Pallid Harriers from East to West Africa. Thus, in Tanzania, c. 80% of the birds are adult males (Stronach 1991), while observations in Senegal, Mauritania and Niger suggest that in these areas there is a high percentage of juveniles (although fewer individuals in general than in East Africa; K. Meyer pers. comm.). Most birds passing through the central Mediterranean in autumn are juveniles and very few are adults, whereas in the Middle East there are many more adults, perhaps even a majority (Shirihai *et al.* 2000). Like adult Montagu's Harriers *C. pygargus* (Arroyo & King 1996), most adult Pallid Harriers are actively moulting during autumn migration (Forsman 1999; pers. obs.) so they would be expected to avoid long sea-crossings such as the Sicilian Channel where possible; perhaps most of them prefer to fly across the Middle East en route to the wintering grounds in East Africa, and from there some eventually move westwards (to wintering grounds from which they head north again in spring, crossing the central Mediterranean). The moult-related hypothesis, that birds prefer to avoid crossing long stretches of water in autumn, would also account for the large numbers of Pallid Harriers recorded in Israel and elsewhere in the Middle East in autumn.

The timing of spring passage in the Middle



East is clearly earlier than that in the central Mediterranean; at Eilat, the majority occur between the first week of April and 10th May (Shirihai & Christie 1992; Yosef 1996) while at Cap Bon and the Strait of Messina comparable dates would be between the fourth week of April and about 15th May. This difference may be related to the fact that many spring migrants through Israel are males, which both migrate earlier and have wintered farther north.

Finally, a double peak of immatures passing through the central Mediterranean is interesting. As shown in fig. 5, most juveniles pass through the Strait of Messina in late April/early May, but there is also a small passage of juveniles through Sicily in mid March, which peaks at the end of that month or in early April (and is often not apparent at Messina – hence it is not obvious in fig. 5). This may reflect two different wintering areas, one much closer (perhaps in Tunisia?) than the other. It may also be the case that during the record influx in Europe during 2000-02, many juveniles wintered in North Africa (Corso in prep.).

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Andrea Corso, Via Camastra, 10-96100 Siracusa, Sicily, Italy

Carmela Cardelli, P.zza Santa Maria La Nuova, is 433-98100 Messina, Sicily, Italy

