Melodious Warbler
Hippolais polyglotta

José Manuel Igual

Range

The Melodious Warbler is a monotypic species that breeds in NW Africa and SW Europe (Cramp, 1992). In all, 90% of its European population breeds in the Iberian Peninsula, France and Italy (BirdLife International, 2004) and since the mid-1930s its populations have increased in range on the NW borders of their distribution (Hagemeiger & Blair, 1997). It winters in W Africa, roughly between 5 and 10ºN, from Gambia, Sierra Leone and Senegal east to Nigeria and Cameroon (Cramp, 1992). It does not breed on the Balearic Islands (Bermejo & De la Puente, 2003) and, of the ringing sites, it only breeds in very low numbers at Els Aiguamolls.

Migratory route

Recoveries, although scarce, reveal a SW to NE passage across the Iberian Peninsula towards the species' northern breeding ranges, as well as the existence of movements due eastwards along the N Mediterranean coast (one bird ringed in NE Spain in late April and trapped 18 days later in N Italy; fig. 1). An individual ringed in Mallorca in early May was recovered in N Morocco seven days later, showing a curious case of reverse migration. Moreover, there is a spring recovery in Morocco of a bird ringed in Italy in May of the preceding year (Spina & Volponi, 2009).

The geographical variation in the frequency of captures indicates that this species is very common along the Spanish Mediterranean coast (it is abundant in spring in the area of the Straits of Gibraltar; Finlayson,1992) and, especially, in NW Morocco; captures, though, are scarce on the Balearic Islands (fig. 2). Our data thus match earlier findings indicating that this species enters Europe through the SW of the Iberian Peninsula (as many other songbirds do; Hilgerloh, 1991) and then heads for the more eastern parts of range, *e.g.* Italy, along the N Mediterranean coast, thereby avoiding a direct sea-crossing (Puzzanghera, 1991; Pilastro et al., 1998). This pattern contrast with that found in warblers with a more easterly breeding range (*e.g.* the Icterine Warbler), which reach Europe from the SE (Spina et al., 1993; Pilastro et al., 1998).

Phenology

A few birds are trapped in late March or early April, but the species' main passage takes place between mid-April and late May, peaking during the first half of May (fig. 3). Passage extends into early June (Telleria et al., 1999; Thévenot et al., 2003). Overall, the pattern is similar to that reported in other areas of the Iberian Peninsula and S France (Blondel & Isenmann, 1981; Cramp, 1992; Finlayson, 1992), although in Italy peak migration occurs a little later (Spina & Volponi, 2009) and in S Morocco *c.* 2-3 weeks earlier (Gargallo et al., unpubl.).

Biometry and physical condition

Mean values for wing lengths vary from 65.5 in N Morocco to 67.4 in S Morocco (table 1), similar to those reported elsewhere (Cramp, 1992). Mean third primary lengths range from 50.0 in the wet Balearics to 51.5 in Catalonia. There is a clear latitudinal trend in third primary lengths: birds passing through N Morocco and Las Chafarinas have the lowest values and those from Catalonia the highest. This pattern may reflect the existence of a S-N clinal trend in size (but published biometric data are inconclusive; cf. Cramp, 1992; Bermejo et al., 2002; ICO, 2010). The third primary length decreases with time in all areas (fig. 6), probably reflecting the differential migration of the sexes: males (slightly longer-winged on average; Cramp, 1992; Svensson, 1992) migrate earlier than females. Males are probably under selective pressure to arrive sooner to establish breeding territories (Bermejo et al., 2002; Rubolini et al., 2004).

The mean fat score varies between 1.4 on Els Columbrets and 3.0 in the wet Balearics, while the mean body mass varies from 10.0 on Las Chafarinas to 11.0 in Catalonia (table 1). Body mass is highest in Catalonia, although birds from N Morocco have similar physical condition and the most fat. Body mass, physical condition and fat reserves are higher in the dry Balearics than on Els Columbrets; in both insular areas physical condition and body mass are lower than in Catalonia. Birds trapped on Las Chafarinas have significantly lower body mass, fat and body condition than those from continental N Morocco. These differences are still significant when considering just Kerbacha, located only a few km south of Las Chafarinas, but not when comparing Las Chafarinas and Sidi Bou Rhaba using data from the same year (2000; no data available for Kerbacha and Las Chafarinas for the same year). Body mass, fat and physical condition increase significantly with time in the dry Balearics but decrease in Catalonia (though not significantly so for condition; figs. 7-9). Values for average body mass in Morocco, Catalonia and the Balearics are very similar to that reported from Gibraltar (mean 11.0, n = 54; Finlayson, 1981) and, at most, are slightly higher than those obtained during the breeding season in SW Europe (means ranging mostly 10.2-10.7; Cramp, 1992; Bermejo et al., 2002; ICO, 2010). Data from S Morocco are too scarce to be conclusive, although the larger datasets available from this area indicate an only slightly lower average mass (mean 10.2, n = 45; Gargallo et al., unpubl.).

Birds may gain some mass after crossing the Sahara, since average mass from S Morocco is *c.* 5% lower than

in the north; however, differences between N Morocco and Catalonia are very small suggesting that birds do not fatten up in any marked way in order to reach Europe. Similar body mass across different sites in SW Europe, moreover, suggests that migration through the continent progresses in short bouts that do not require long stopovers or marked gains in mass (see below). Birds crossing large stretches of sea are subjected to higher energetic demands, as shown by the lower fat reserves and body mass and poorer physical condition of birds trapped on Els Columbrets and the Balearics, although differences with respect to N Morocco are not large (physical condition only 2-7% poorer).

Stopover

Only a minority of birds stay at the study sites (up to 8%) and largely only for very short periods of time (fig. 5, table 2). Birds from Catalonia have significant and positive fuel deposition rates (in retraps of more than one day) and undertake longer mean stopovers than those from insular areas. The few breeding birds at Els Aiguamolls may have spuriously increased mean stopover length, since at other Catalan wetlands where the species does not breed mean stopover is only 2.2 days (although the sample size is small; n = 4). In the dry Balearics and on Els Columbrets birds retrapped again tend to have lower body mass than those not retrapped, but these differences are not significant. On Las Chafarinas, in spite of the lack of suitable habitat, the fuel deposition rate is significantly positive, although not in birds staying more than one day. Overall, the present results suggest that birds do not increase body mass in any marked way during their stopovers, which are particularly short and seem to involve a higher proportion of individuals in poor body condition on isolated islands lacking suitable habitat.

Table 1. Mean (± SD), range and sample size of main biometric parameters according to area.

	n	Wing	Third primary	Body mass	Fat score
Catalonia	656	67.1 ± 1.8 (61.0-73.0)	51.5 ± 1.6 (46.0-57.0)	11.0 ± 0.9 (7.6-14.2)	2.2 ± 1.2 (0-6)
Columbrets	535	67.0 ± 2.2 (60.5-73.0)	51.2 ± 1.7 (46.0-57.0)	10.2 ± 0.9 (6.7-13.7)	1.4 ± 1.0 (0-6)
Balearics (dry)	735	66.3 ± 2.0 (60.0-74.0)	51.0 ± 1.8 (46.0-56.5)	10.6 ± 1.1 (6.9-14.3)	2.2 ± 1.2 (0-5)
Balearics (wet)	1	65.5	50.0	10.2	3.0
Chafarinas	390		50.2 ± 1.7 (46.0-55.0)	10.0 ± 0.9 (7.1-14.6)	1.9 ± 1.2 (0-5)
N Morocco	181	65.5 ± 2.2 (61.0-72.0)	50.1 ± 1.7 (46.0-55.0)	10.7 ± 1.1 (8.3-14.1)	2.7 ± 1.4 (0-6)
S Morocco	6	67.4 ± 1.4 (66.0-70.0)	51.3 ± 1.1 (50.0-53.0)	10.6 ± 0.6 (9.7-11.4)	2.7 ± 1.0 (1-4)

Table 2. Variation in fuel deposition rate (g/day) according to area and type of retraps involved (mean ± 95% CI and sample size are given).

	Catalonia	Columbrets	Balearics (dry)	Balearics (wet)	Chafarinas	N Morocco
All retraps	0.00 ± 0.12 (52)	-0.25 ± 0.32 (7)	0.06 ± 0.28 (22)		0.28 ± 0.23 (13)	-0.19 ± 0.22 (10)
Retraps >1 day	0.10 ± 0.07 (36)	-0.43 ± 0.60 (3)	-0.05 ± 0.36 (6)		0.11 ± 0.25 (7)	-0.04 ± 0.18 (5)

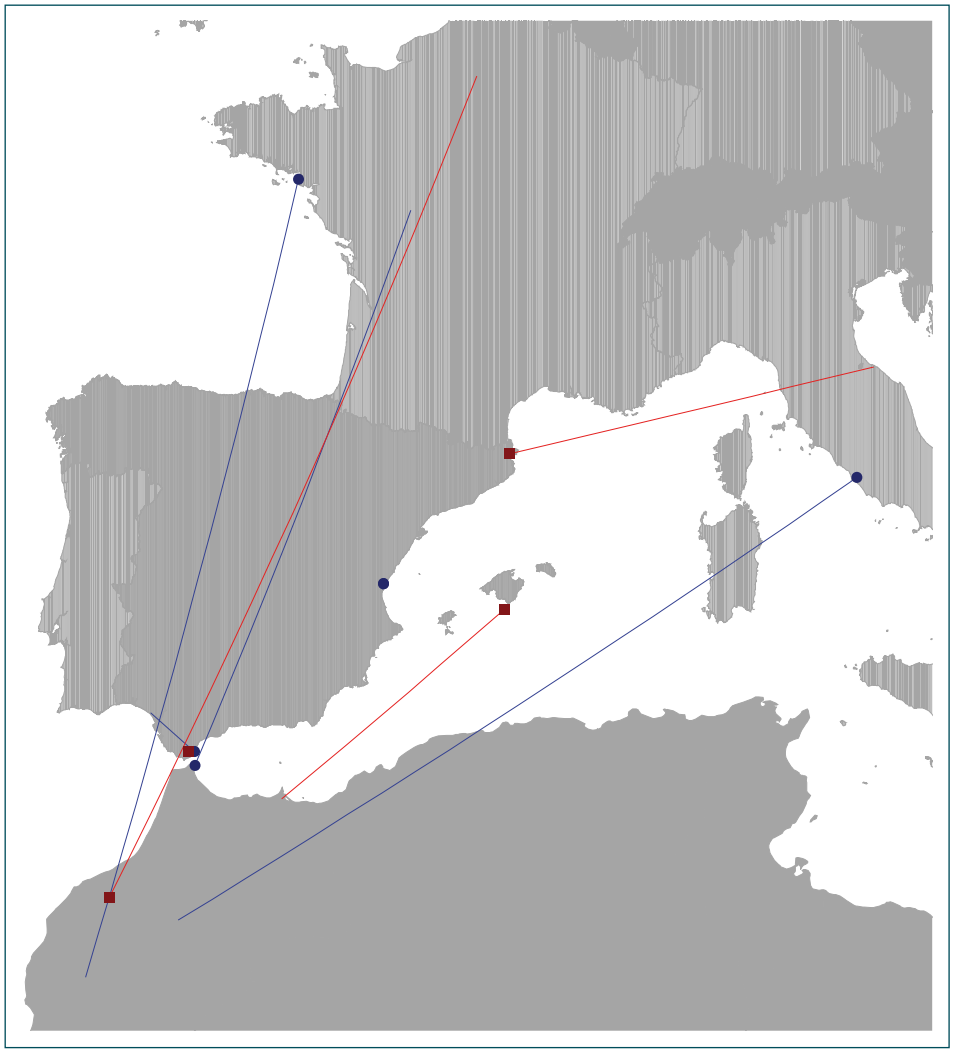

Figure 1. Map of recoveries of birds captured in the study area during the study period (March to May).

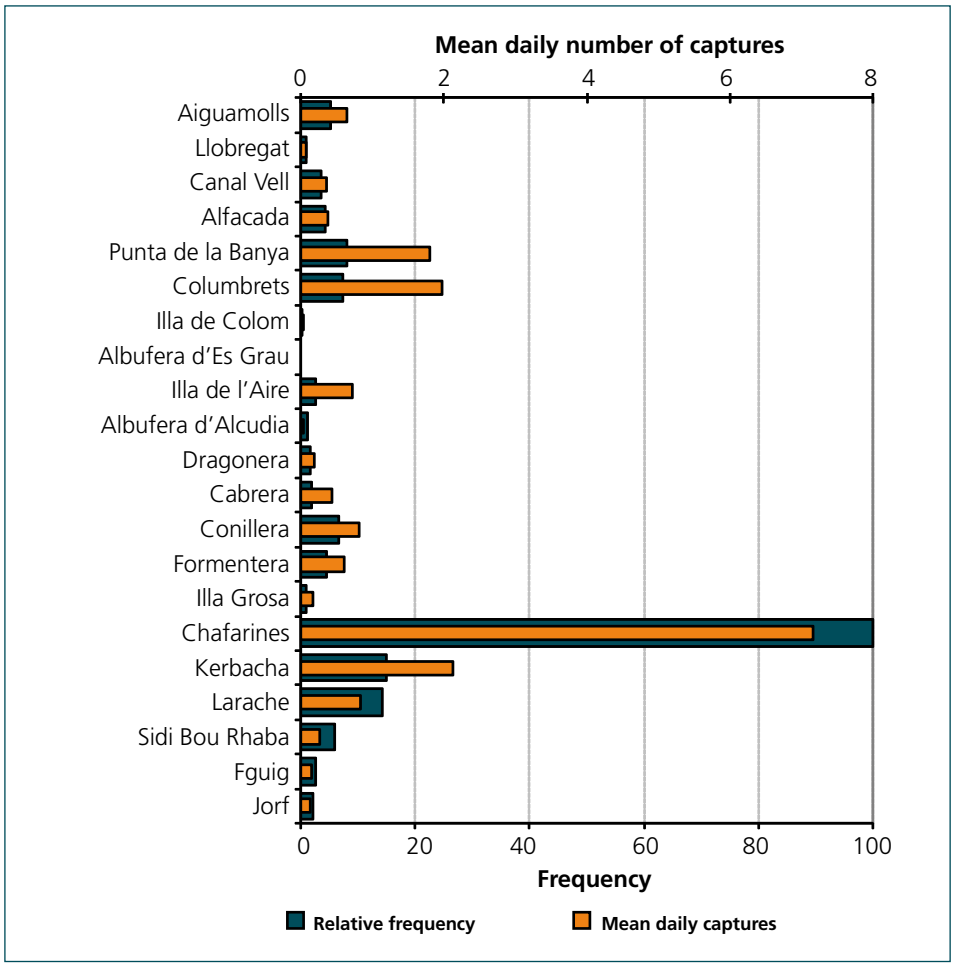

Figure 2. Relative frequency of captures and mean daily numbers according to site during the standard period (16 April to 15 May).

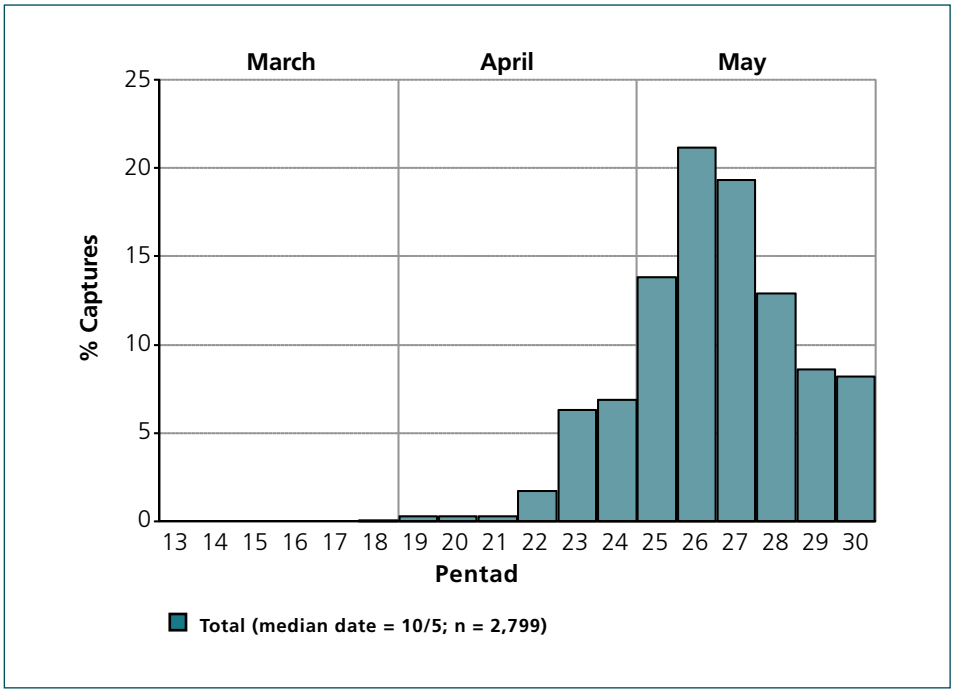

Figure 3. Frequency of captures during the study period.

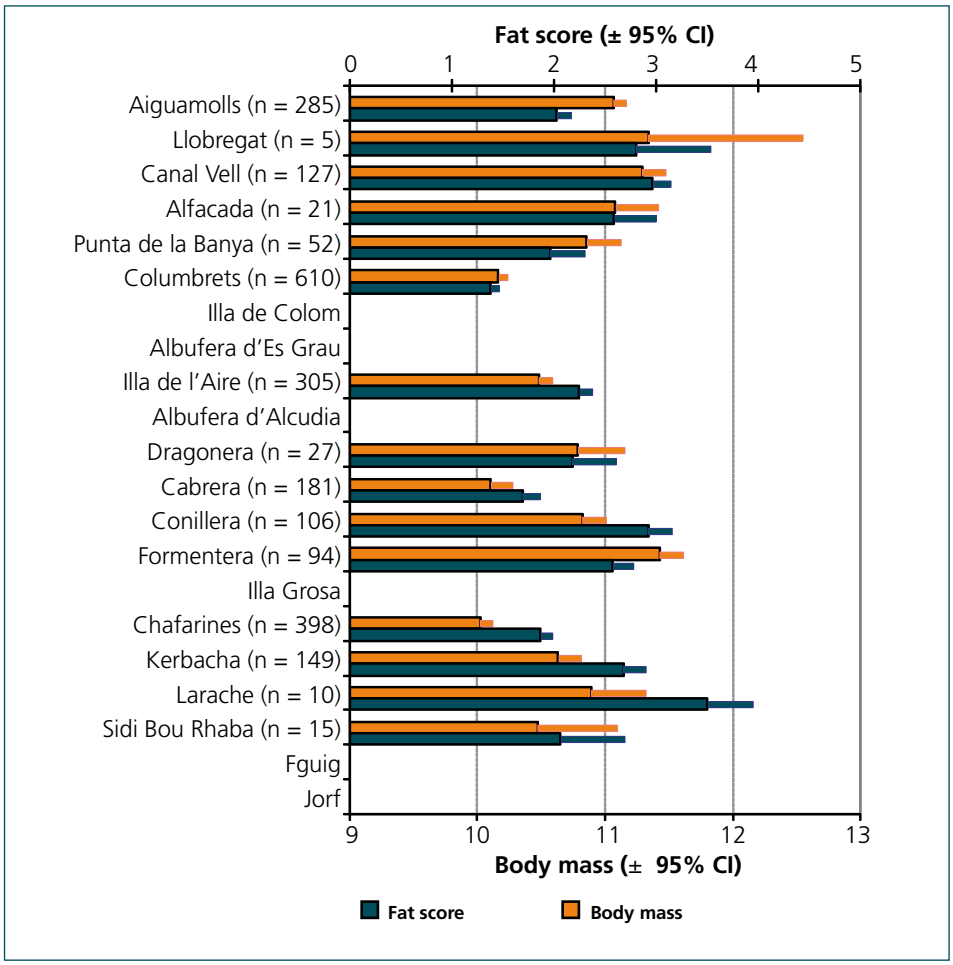

Figure 4. Variation in body mass and fat score according to site during the standard period (16 April to 15 May).

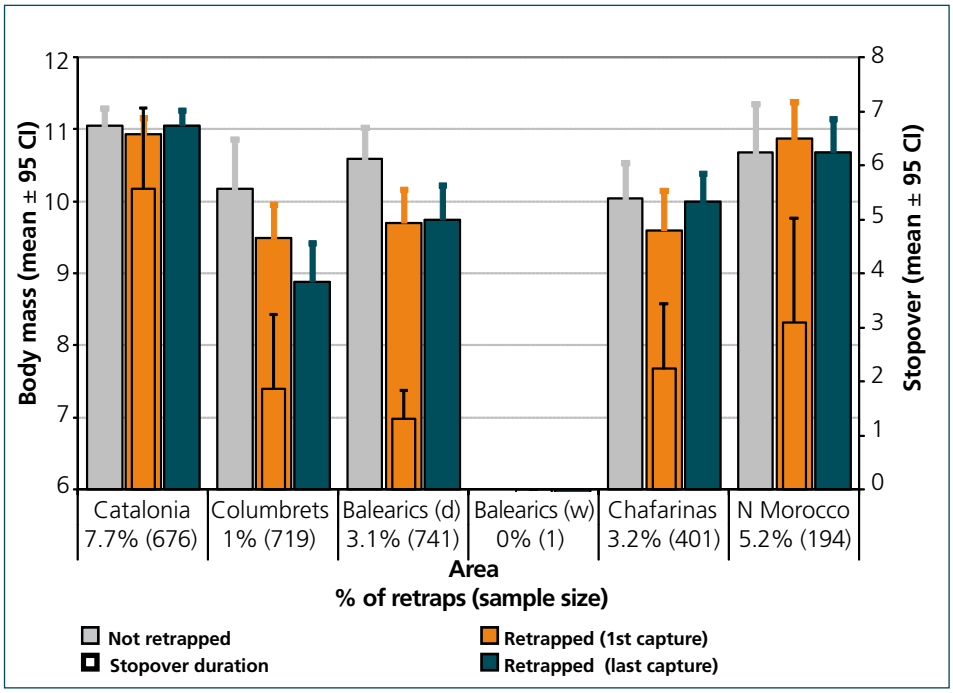

Figure 5. Variation in body mass by trapping status, minimum stopover length and frequency of retraps according to area.

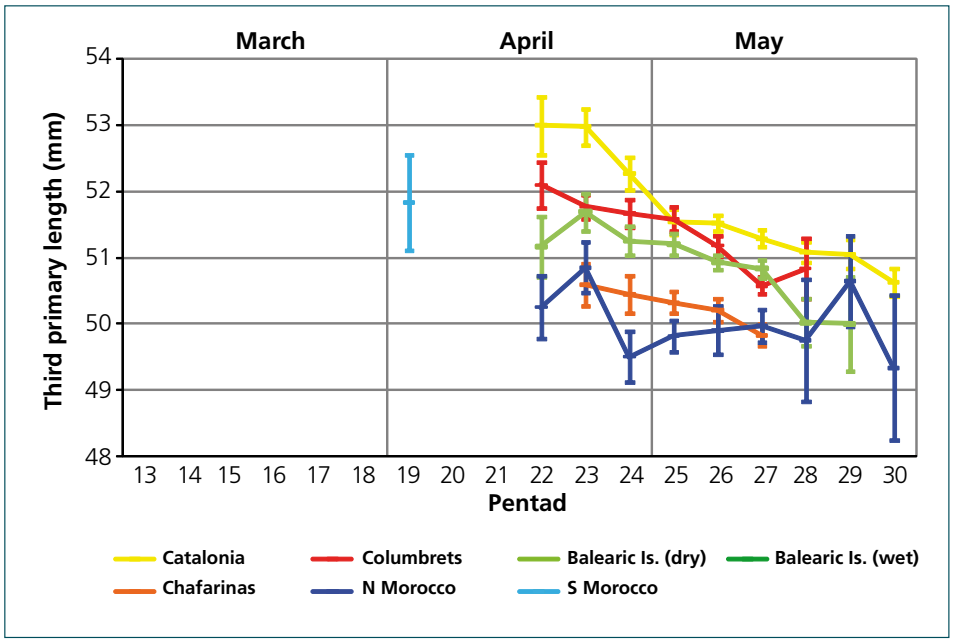

Figure 6. Temporal variation of third primary length according to area.

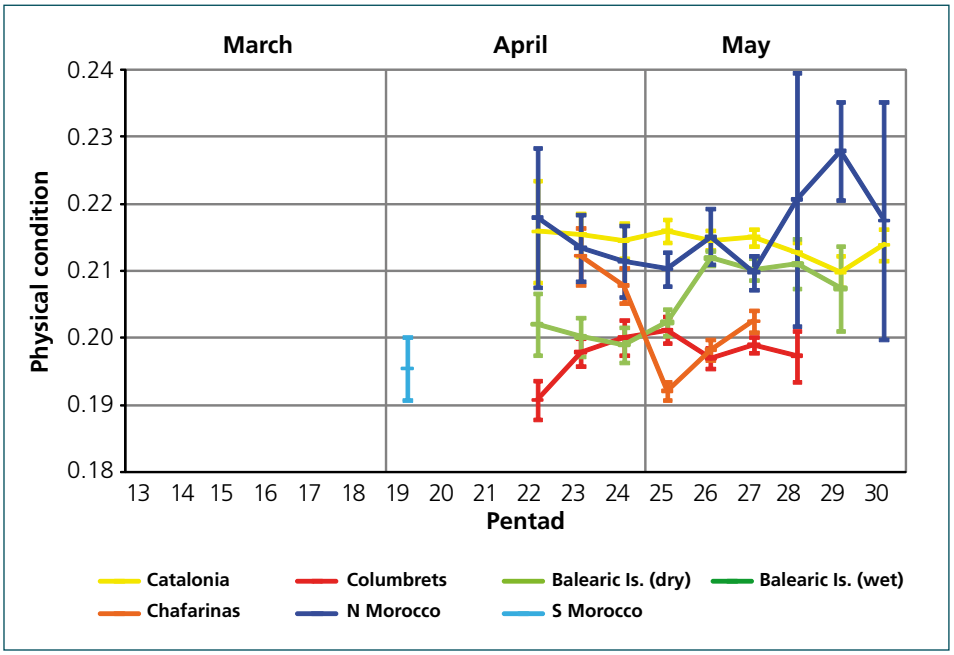

Figure 7. Temporal variation of physical condition according to area.

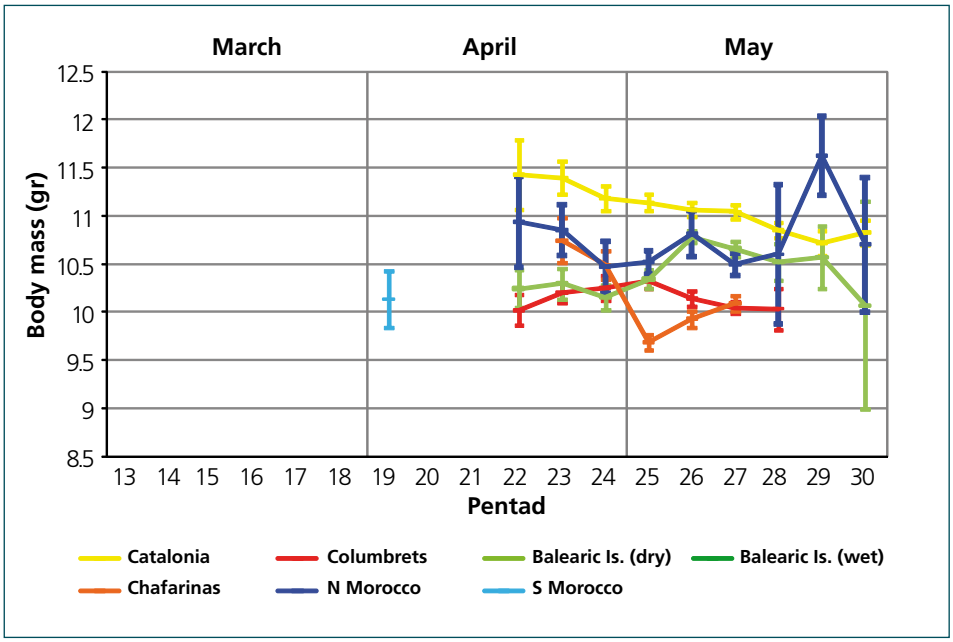

Figure 8. Temporal variation in body mass according to area.

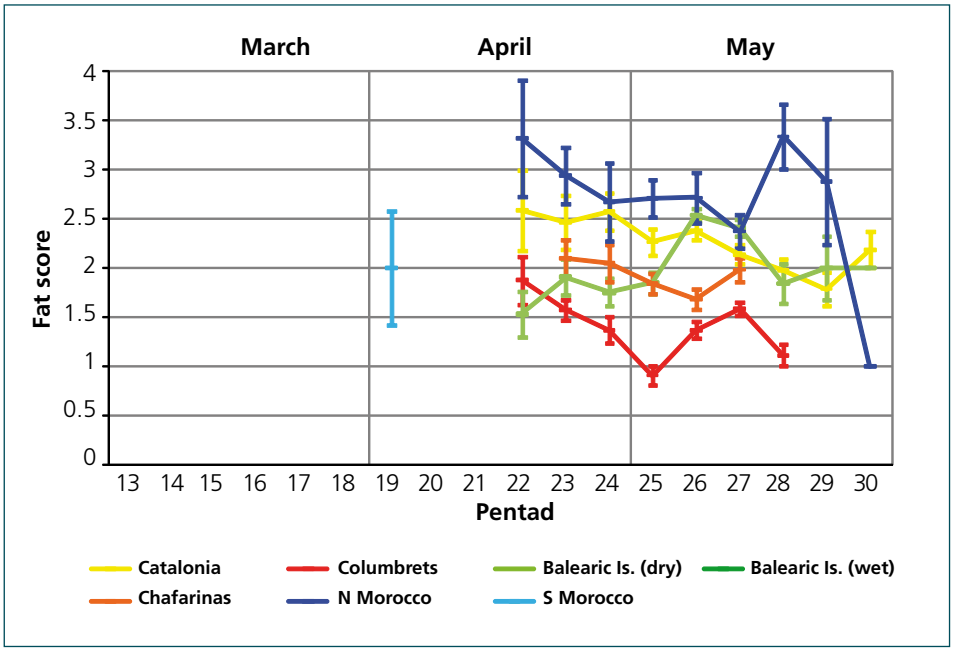

Figure 9. Temporal variation in fat score according to area.