Whitethroat

Sylvia communis

Raül Escandell & Óscar García

Range

The Whitethroat breeds throughout much of Europe, except for the northernmost areas and parts of the Mediterranean Basin, and then eastwards through western C Asia as far as Lake Baikal (Shirihai et al., 2001). All populations are migratory, wintering in sub-Saharan Africa, from Senegal east to Ethiopia and south to S Africa; birds breeding west of 10ºE tend to move SW to winter in West Africa, while those of more eastern origin head more S and SE towards E and S Africa (Zink, 1973; Cramp, 1992). Only the nominate subspecies appears in the W Mediterranean region (Shirihai et al., 2001). This species does not breed at any of the ringing sites.

Migratory route

The Whitethroat has a clear SSW-NNE direction of migration; nevertheless, some birds undertake N or NNW movements, in all cases towards the British Isles (fig. 1). This is the case of a second-year female ringed in the Balearics on 22 April and recovered 27 days later in N Scotland and reflects the more direct route followed during this season by birds originating in the British Islands (Wernham et al., 2002). Available data, thus, indicates that in spring birds cross the area using a more due N main axis of movement than in autumn, when birds migrate largely NE-SW. The scarcity of spring recoveries in the western Iberian Peninsula (Cantos, 1992) further reflects this pattern. It is interesting to note that some birds move towards eastern C Europe, well eastwards of the 10ºE migratory divide roughly observed during autumn migration (Cramp, 1992). Moreover, some birds seem to cross the Mediterranean by different routes in different years, as shown by a bird trapped in the Balearics in May 1992 and recovered on the Tyrrhenian islands in April 1994, 923 km away (but at a similar latitude).

The Whitethroat is happy to cross the Mediterranean across a broad front, as indicated by both the raw number of captures and relative frequencies on stations located on islands (fig. 2). Passage is also considerable in the C Mediterranean and this species is also trapped in good numbers in the Tyrrhenian area, representing the bulk of Italian spring recoveries (Spina & Volponi, 2009; Spina et al., 1993).

Phenology

The first birds pass through the area at the end of March, although the main passage period takes place from mid-April to mid-May (fig. 3). Passage declines during the second half of May, but is still noticeable towards the end of the month, indicating that migration continues into early June. The overall phenological pattern is similar in the three main study areas (Catalonia, N Morocco and the Balearics/Els Columbrets), although on the islands passage takes place on average *c.* 5 days later and is somewhat more patent during the second half of May. In the Strait of Gibraltar and N Morocco passage can occasionally begin in late February, but usually not before late March (Finlayson, 1992; Thevenot et al., 2003). In S Morocco passage usually gets underway in mid-March and peaks in April (Gargallo et al., unpubl.). Median dates of passage through the Tyrrhenian islands are on average 2-9 days later than in our study area (Pattersson et al., 1990; Rubolini et al., 2005), as shown by the earlier arrival of birds in W as opposed to C Europe (Cramp, 1992).

Males pass through the W Mediterranean somewhat earlier than females (medians 4-6 days earlier depending on age group) and adults slightly earlier than second-year birds (2-4 days; fig. 3). Similar sexual differences have been observed on the Tyrrhenian islands (median passage of males also 4 days earlier; Spina et al., 1994; Rubolini et al., 2004) and the Strait of Gibraltar (Finlayson, 1992).

Biometry and physical condition

Mean third primary lengths range from 53.2 on Las Chafarinas to 56.8 in S Morocco (table 1). Mean values for wing lengths vary from 71.1 in N Morocco to 73.3 in the wet Balearics. These figures are slightly smaller than those reported from C Mediterranean (mean 55.8 for third primary, n = 19,834, and 74.0 for wing length, n = 12,849; Messineo et al., 2001), probably due to the slight clinal variation in size shown by this species towards the east (Cramp, 1992). This pattern suggests that migration occurs across a broad front across the Sahara. There is a slight but significant decreasing trend in the mean third primary length during the season, especially marked in the dry Balearics, Els Columbrets and Catalonia, a reflection of the differential migration of the sexes (longer-winged males pass earlier; see above).

Mean values for fat score vary between 1.1 on Las Chafarinas and 3.5 in N Morocco (4.3 in the small dataset from S Morocco), while mean body mass varies from 12.9 on Las Chafarinas to 15.1 in the wet Balearics (table 1). In the dry Balearics, body mass, fat and physical condition increase significantly during the season but the opposite pattern is observed on Els Columbrets (figs. 7-9). Body mass on islands of the C Mediterranean (14.0, n = 20,178; Messineo et al., 2001) is similar to that from the dry Balearics and Els Columbrets. In Gibraltar on the north side of the strait average body mass (14.0, n = 26; Finlayson, 1981) is only slightly lower than in N Morocco and Catalonia, and averages reported further north in S England (mean 14.3, n = 200) and Germany (Helgoland; mean 15.0, n = 16) are also similar. Body mass in N Tunisia (mean 16.0, n = 51; Waldenström et al., 2004) is higher than in N Morocco, while that given here for S Morocco is also below that of much larger datasets from the nearby sites of Defilia (mean 13.7, n = 58; Ash, 1969) and Merzouga (mean 14.0, n = 63; Gargallo et al., unpubl.). Overall, these results indicate that birds gain some mass during their stay in NW Africa, but only to a limited extent: birds from N Morocco are in better body condition (fat, physical condition), although their average body mass is only *c.* 4-11% higher than in S Morocco. Mean body mass, however, does not seem to vary greatly from N Morocco to C Europe, suggesting that migration takes places in short bouts that do not require long stopovers or marked gains in mass (as shown below).

Birds from the wet Balearics have significantly greater body mass and fat reserves than those from more isolated and sparsely vegetated islands (*e.g.* the dry Balearics and Els Columbrets), suggesting that those stopping on these latter areas include a higher proportion of birds urged to stop. On the other hand, Las Chafarinas have the lowest averages for body mass and fat score (significantly lower than all the study areas except Els Columbrets) (table 1; figs. 8-9). Differences are particularly large in relation to continental N Morocco (mean body mass and fat being even below that usually recorded in S Morocco) and, above all, Kerbacha (fig. 4), located only a few km to the south of Las Chafarinas. Data from Las Chafarinas and Kerbacha comes from different years and mean values on Las Chafarinas were lower in all available years, but only significantly so in 2000. The average third primary length in Las Chafarinas is also significantly the lowest, except when compared to continental N Morocco (differences are nearly significant when compared to Kerbacha). As observed in other species, these results suggest that Chafarinas attract birds in poor body condition, apparently birds often forced to change or reverse flight direction due to unfavourable meteorological circumstances encountered during the sea crossing (note that Las Chafarinas are less than 4 km off the Moroccan coast). The fact that birds trapped on Las Chafarinas also tend to have shorter wings suggests that these birds may be more prone to suffer from such unfavourable circumstances (particularly strong head winds) or that females and younger individuals (with shorter wings) may take fewer risks when migrating (having less need to migrate faster and arrive earlier), and thus be more inclined to stop at suboptimal habitats or reverse migration when facing problems.

Stopover

The highest percentage of recaptured birds occurs in N Morocco, Catalonia and the dry Balearics, although overall figures are low (fig. 5). Mean stopover length is rather short in all areas too, ranging from *c.* 2-4 days. Birds do not tend to gain or lose body mass during their stopover in any important or significant way in any of the studied areas (marginally gaining some mass in the dry Balearics) (table 2). At this site, however, those stopping for more than one day have significantly lower body mass than birds not retrapped again (a tendency also observed on Els Columbrets, although the differences are not significant), suggesting that these areas do not offer good opportunities for refuelling and that mostly birds unable to continue their migrations stop in these areas for more than one day. On Las Chafarinas, birds show nearly significant positive fuel deposition rates, although the sample is too small to be conclusive.

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

	n	Wing	Third primary	Body mass	Fat score
Catalonia	1,142	72.1 ± 2.1 (64.0-80.0)	55.1 ± 1.8 (48.5-60.0)	14.4 ± 1.5 (10.9-22.6)	3.0 ± 1.3 (0-7)
Columbrets	1,219	71.7 ± 2.3 (64.5-79.5)	54.4 ± 2.0 (48.0-61.0)	13.6 ± 1.8 (8.7-21.9)	1.8 ± 1.4 (0-8)
Balearics (dry)	5,443	71.8 ± 2.3 (64.0-80.0)	54.7 ± 2.0 (48.0-61.0)	13.9 ± 1.7 (8.5-21.8)	2.5 ± 1.5 (0-8)
Balearics (wet)	26	73.3 ± 3.1 (69.0-80.0)	55.3 ± 2.2 (52.0-60.0)	15.1 ± 2.9 (10.9-22.7)	3.3 ± 1.7 (1-6)
Chafarinas	41		53.2 ± 1.4 (49.5-56.5)	12.9 ± 1.5 (10.4-18.7)	1.1 ± 1.1 (0-5)
N Morocco	52	71.1 ± 2.5 (66.0-79.5)	54.3 ± 1.5 (49.5-57.0)	14.6 ± 1.6 (11.3-19.2)	3.5 ± 1.7 (0-7)
S Morocco	3	71.8 ± 0.8 (71.0-72.5)	56.8 ± 2.0 (54.5-58.0)	13.1 ± 2.5 (11.6-16.0)	4.3 ± 1.5 (3-6)

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	-0.07 ± 0.14 (61)	-0.22 ± 0.22 (26)	-0.04 ± 0.06 (380)		0.35 ± 0.35 (2)	0.09 ± 0.82 (4)
Retraps >1 day	0.04 ± 0.14 (30)	-0.02 ± 0.28 (10)	0.05 ± 0.05 (249)			

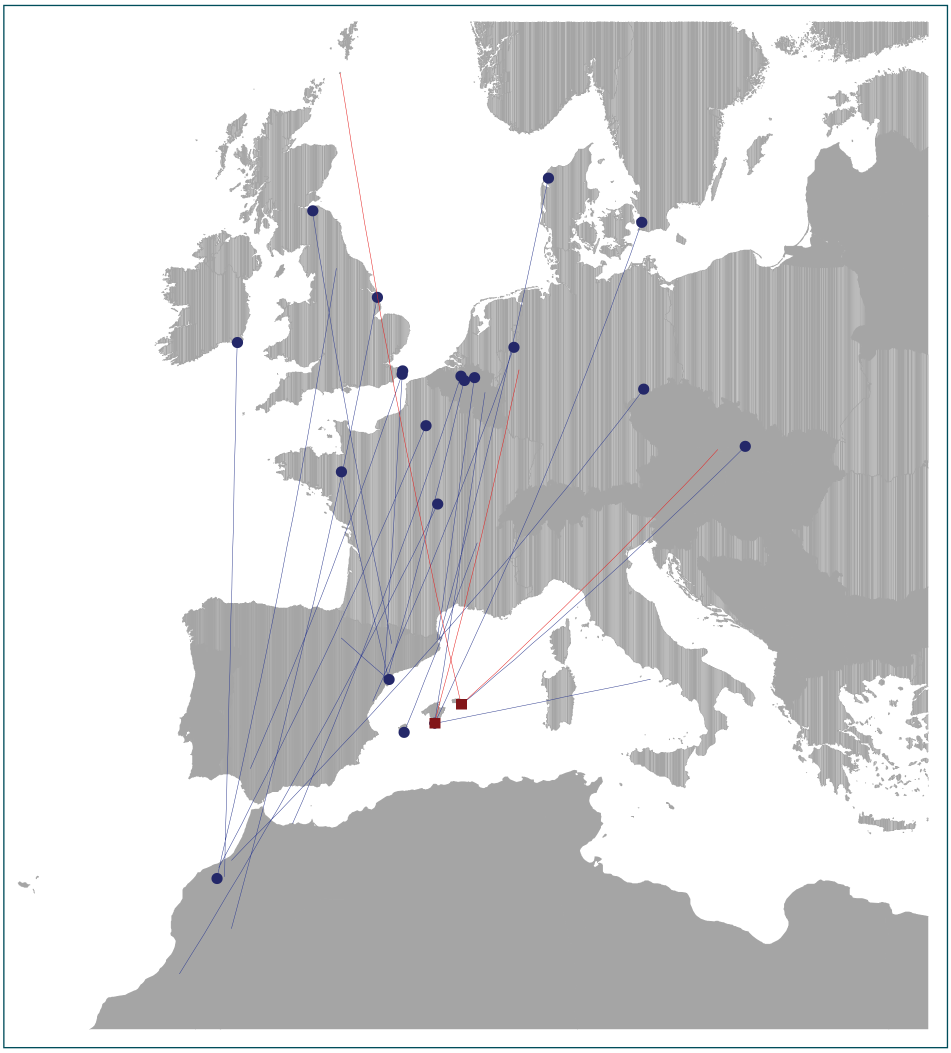


Figure 1. Map of recoveries of birds captured in the study area during the study period (March to May).

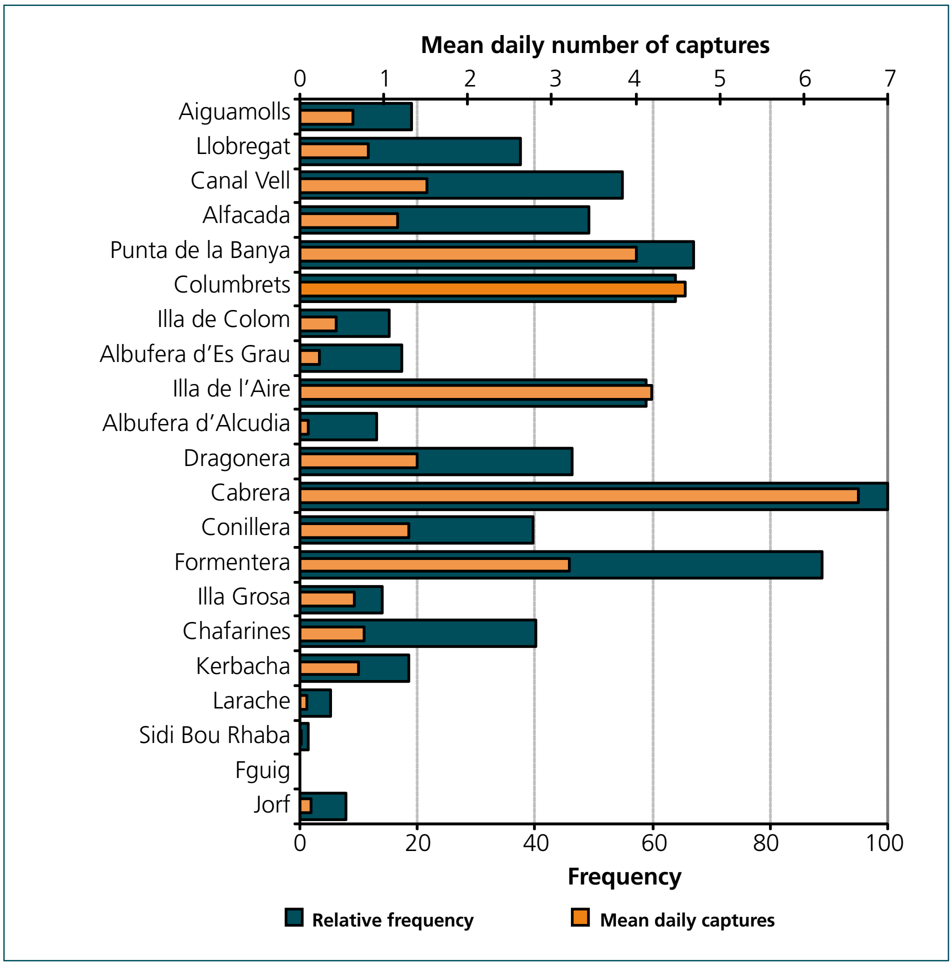


Figure 2. Relative frequency of captures and mean daily numbers according to site during the standard period (16 April to 15 May).

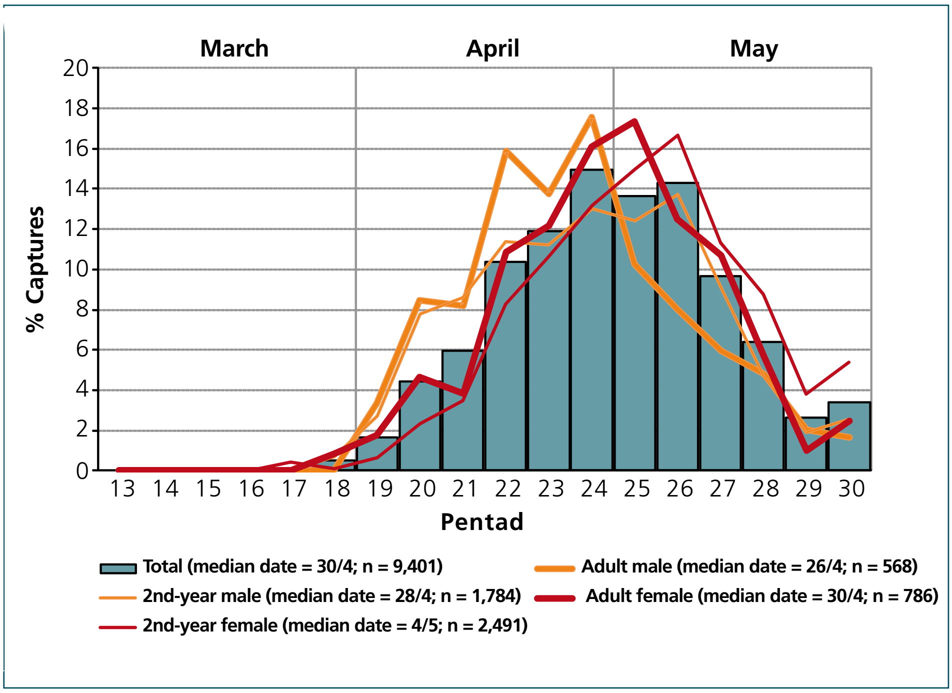


Figure 3. Frequency of captures during the study period.

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

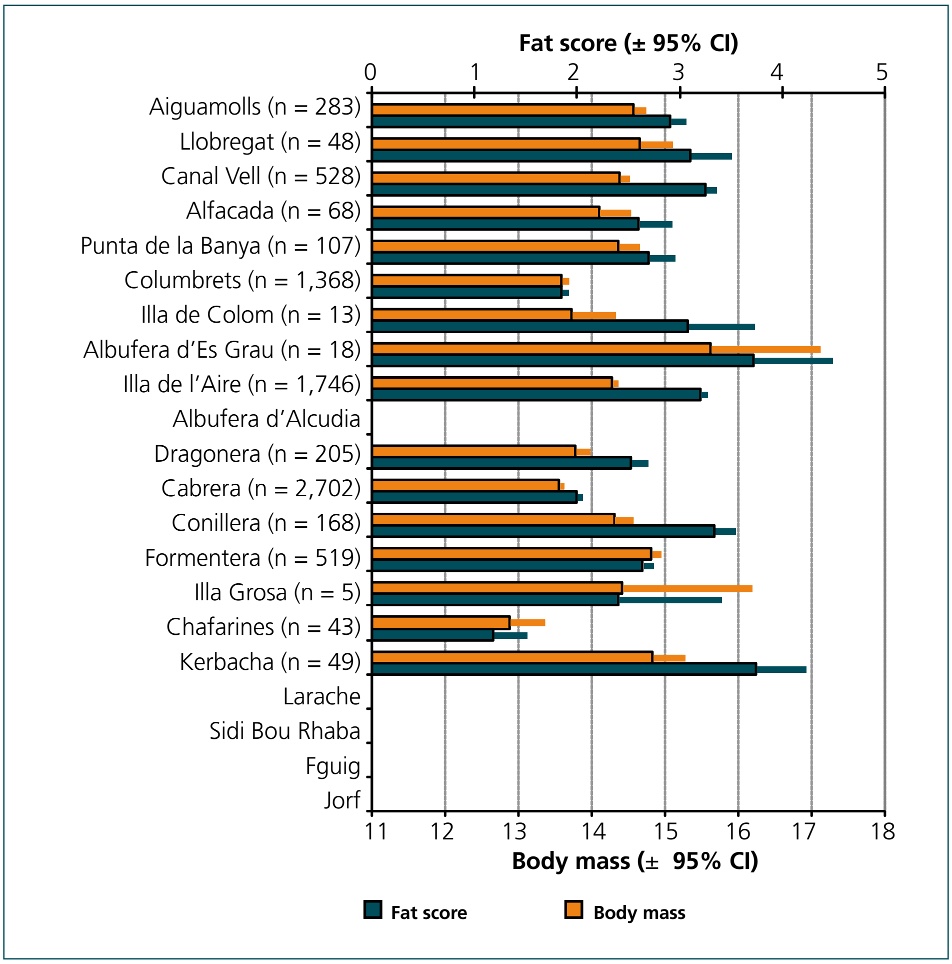
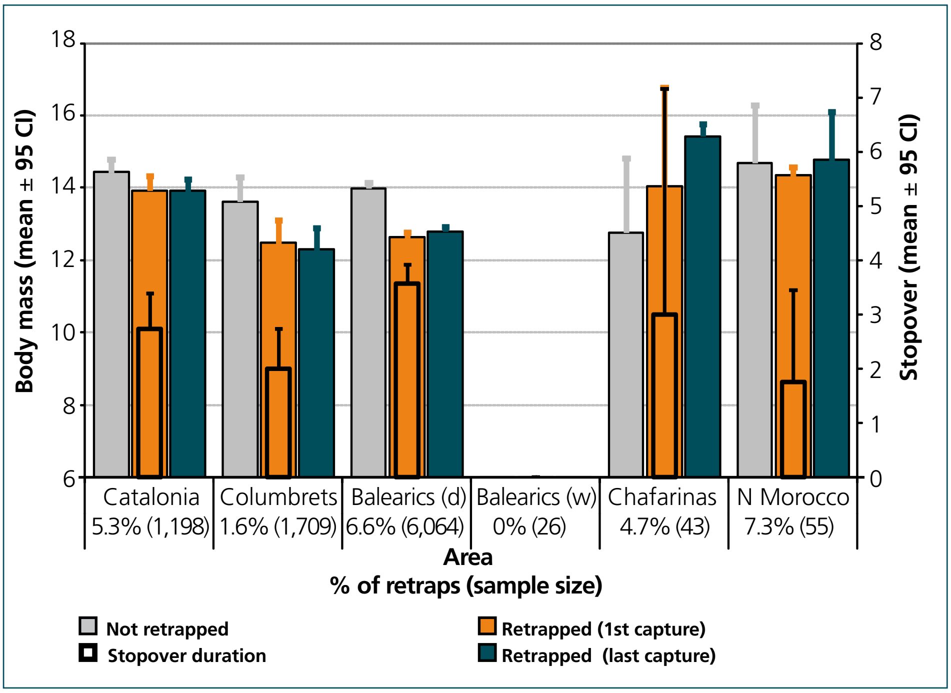


Figure 5. Variation in body mass by trapping status, minimum stopover length and frequency of retraps according to area.



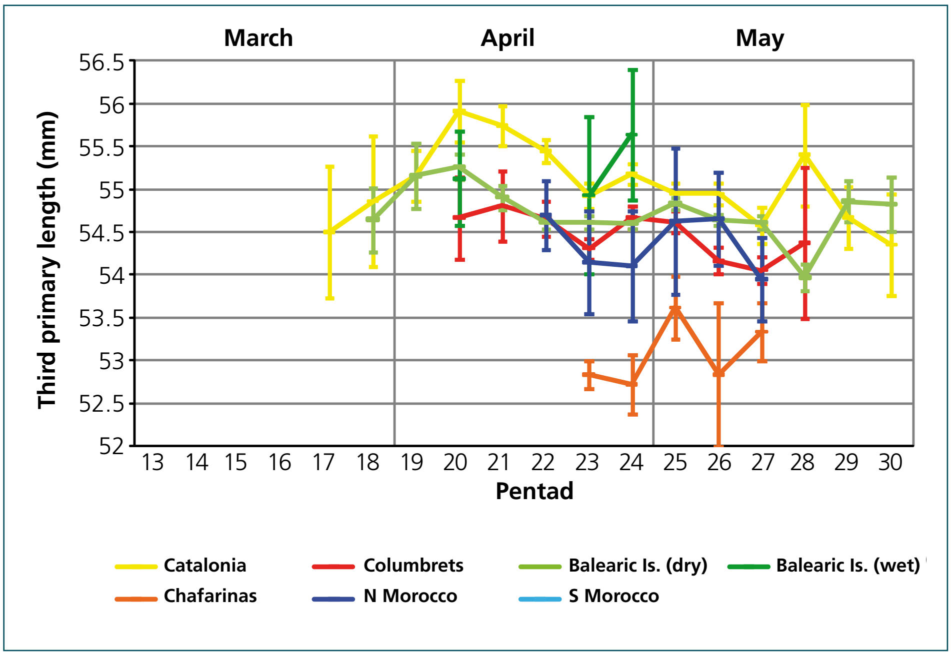


Figure 6. Temporal variation of third primary length according to area.

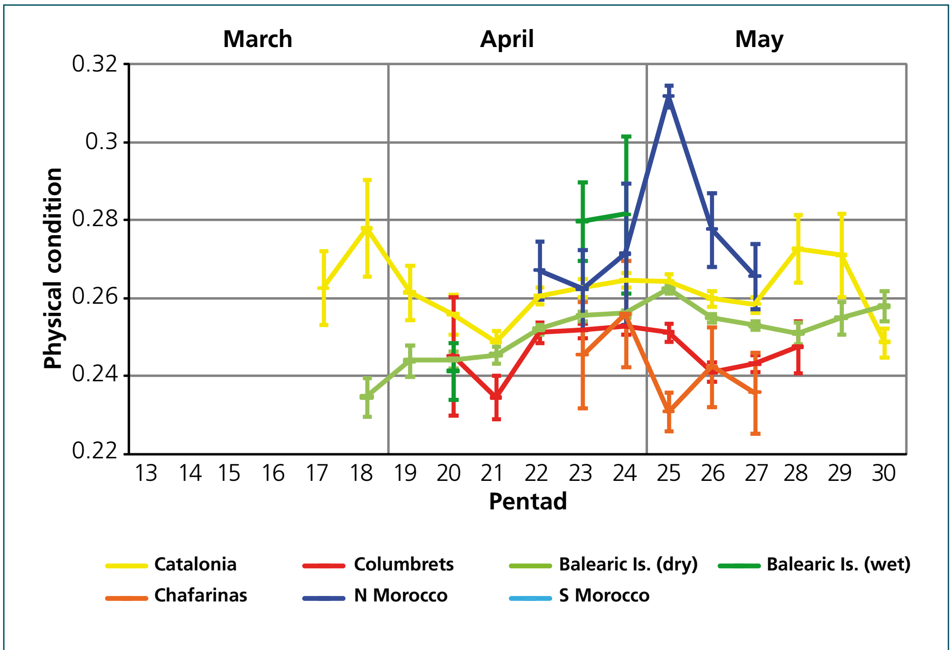


Figure 7. Temporal variation of physical condition according to area.

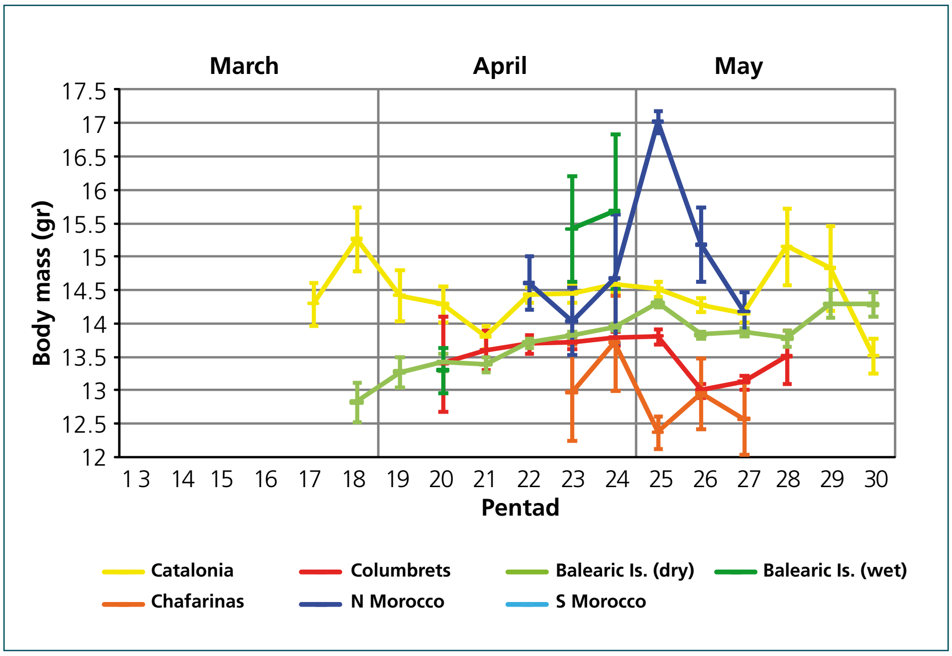


Figure 8. Temporal variation in body mass according to area.

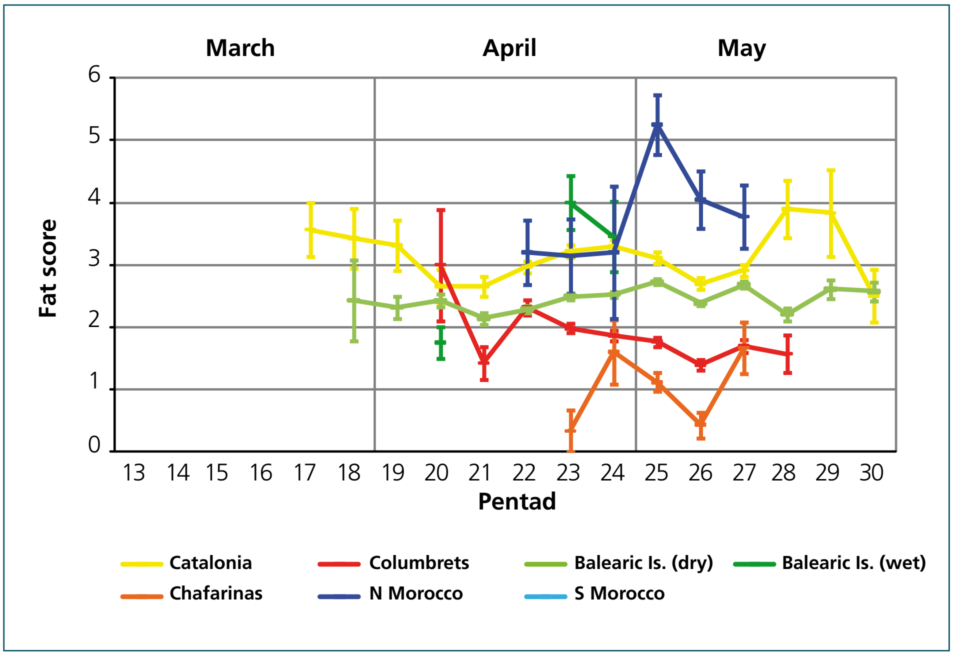


Figure 9. Temporal variation in fat score according to area.