Common Chiffchaff *Phylloscopus collybita*

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Range

The Common Chiffchaff breeds in upper and lower middle latitudes of the W Palearctic, including most of Europe east as far as E Siberia (Cramp, 1992). It winters chiefly in SW Europe around the Mediterranean and in a huge area including the northern Afrotropics, Arabia and N India (Cramp, 1992). It does not breed on the Balearic Islands, in Morocco or at any of the ringing sites; however, it is a common wintering species in all areas except for the dry Balearics, Els Columbrets, L'Illa Grossa and Las Chafarinas, where migrants constitute the bulk of captures.

The recently split Iberian Chiffchaff *Phylloscopus ibericus* breeds in the Iberian Peninsula, S France and NW Africa, and winters primarily in tropical Africa (Svensson, 2001; Pérez-Tris et al., 2003; Catry et al., 2005). Records from Catalonia and the Balearics are very scarce but our sample from these areas undoubtedly includes a very few misidentified Iberian Chiffchaffs (since in former years this taxon was not systematically told apart). In Morocco, where Iberian Chiffchaffs are more common during migration (Gargallo et al., unpubl.), the number of birds wrongly identified as Common Chiffchaffs must be slightly higher.

Migratory route

Recoveries indicate that the Common Chiffchaff migrates on a broad front through the W Mediterranean towards its breeding grounds in C and N Europe, in the main heading SW-NE (fig 1; Zink, 1985). Unlike in autumn, the W Iberian Peninsula is largely devoid of birds in spring; while passage increases in coastal E Spain and the Balearics (present data; Cantos, 1992). An interesting deviation from the main migratory pattern comes in the form of a bird ringed in Barcelona in late March and recovered one month later in Sardinia (heading E-SE).

The geographical variation in the frequency of captures during the standard period gives little information in this case, since captures become much scarcer from mid-April onwards and data from Morocco may also include some Iberian Chiffchaffs (fig. 2). Taking into account the full study period, 24% of the birds were trapped in three continental wetland sites where the species is common both in winter and during migration: Els Aiguamolls, El Canal Vell and the Llobregat delta. The majority (66%), however, were ringed on three insular sites where this warbler is essentially migratory: L'Illa de l'Aire, Cabrera and Els Columbrets. It is clear from the high number of captures at these sites that these islands act as points of attraction for migrants needing to rest, and they are also proof that this species crosses the Mediterranean in good numbers. This is probably also the case for many birds from NW Africa, where the species is very common in winter (Cramp, 1992; Isenmann & Moali, 2000; Thévenot et al., 2003; Isenmann et al., 2005).

Phenology

Passage begins in February (outside the study period) followed by a peak in mid-March. Captures then decrease steadily through April, and a few individuals are still trapped well into May (fig. 3). The main pattern of passage is similar in the Balearics/Els Columbrets and Catalonia, although in N Morocco late passing birds are somewhat more frequent. Overall, passage through the study area is similar to that recorded in spring from Gibraltar (Finlayson, 1992), La Camargue (Blondel & Isenmann, 1981), the Tyrrhenian islands (Spina et al., 1993) and Israel (Morgan & Shirihai, 1997). No clear age-related differences in phenology are observed. The frequency distribution of third primary lengths, however, indicates a clear temporal segregation of sexes: males (distinctly larger; Cramp, 1992) pass during first half of March and females mostly from mid-March onwards (fig. a). This differential migration has also been observed in Eilat (Morgan & Shirihai, 1997) and the C Mediterranean (Spina et al., 1993). The early passage of male Chiffchaffs seems to be caused by their early departure from the wintering grounds and not only by a differential speed between sexes during migration (Catry et al., 2005). Interestingly, a new wave of larger birds (males) passes through the area from mid-April onwards (a pattern that may occur also in the C Mediterranean; *cf.* Spina et al., 1993). This new wave may reflect the passage of birds belonging to more north-eastern and late migrating populations (Cramp, 1992), perhaps wintering in tropical Africa. Recoveries do not reveal any pattern regarding the timing of passage and geographical origin because available data is very scarce late in the season.

Biometry and physical condition

Mean values for third primary lengths range from 43.8 (S Morocco) to 45.1 (Catalonia; table 1). In most areas averages are slightly higher than in the C Mediterranean (overall mean 43.8, n = 1,010; Spina et al., 1993), probably due to the inclusion of a higher proportion of males (as more early-season data is available). Mean values for wing lengths vary from 56.7 (dry Balearics) to 58.3 (Catalonia), within the range of the nominate race in W Europe (Cramp, 1992), but lower than in E Mediterranean, where birds from the larger north-eastern populations are common (Morgan & Shirihai, 1997). The third primary length shows a marked tendency to decrease during March, but then in early April the tendency inverts and is slightly upwards (fig. 6). This is a similar pattern to that previously found in the C Mediterranean (Spina et al., 1993) and reflects the differential migration of the sexes described above.

Mean fat scores range between 1.2 (Els Columbretes) and 2.8 (S Morocco). Fat is lowest on Els Columbrets, but otherwise differences between areas are not significant. Physical condition is also worst on Els Columbrets, but better in N Morocco than in Catalonia and the dry Balearics. Birds from the wet Balearics also have better physical condition than those from the dry Balearics, probably due to a higher proportion of wintering birds in the former area and its better suitability as a stopover site (it attracts a smaller proportion of migrants in poor condition and provides better feeding options for gaining mass). Fat shows a slight tendency to increase in March and decrease in May, reaching a peak in April (fig. 9); in the dry Balearics the overall temporal trend is significantly negative. Physical condition tends to increase slightly with time (fig. 7).

Mean body mass varies from 7.0 (Els Columbrets) to 7.6 (N Morocco; table 1). Seasonal variation differs between study areas, decreasing significantly in Catalonia and on Els Columbrets, but increasing in the wet Balearics; it shows no clear pattern in the dry Balearics and Morocco (fig. 8). Birds from N Morocco are similar to those from the wet Balearics, and both are significantly heavier than those from Catalonia; birds from Els Columbrets and the dry Balearics have the lowest average body mass. Average mass in N Morocco is somewhat higher than that reported by other authors in roughly the same area during March (mean 7.1, n = 41; Cramp, 1992) and similar to that reported in a very limited sample from N Tunisia (mean 7.6, n = 4; Waldenström et al., 2004). Mean values from S Morocco are higher than those reported from the nearby areas of Defilia (mean 6.3, n = 17; Ash, 1969) and Merzouga (mean 7.2, n = 78; Gargallo et al., unpubl.). The overall average body mass (mean 7.2; n = 140) is only slightly lower than in N Morocco. Although our data and that from Ash (1969) may include some Iberian Chiffchaffs, the body mass of both species is very similar in S Morocco (Gargallo et al., unpubl.). Body mass in Catalonia is only slightly higher than at Gibraltar (mean 7.0, n = 88; Finlayson, 1981) and similar or somewhat lower than that reported in Wales and the Netherlands further to the north (means 7.5 [n = 101] and 8.3 [n = 19], respectively; Cramp, 1992). Averages in the dry Balearics and on Els Columbrets are very similar to those reported from the C Mediterranean (mean 6.9, n = 1,010; Spina et al., 1993).

Overall, body mass shows very little geographical variation across NW Africa and SW Europe and average figures are mostly similar to those recorded during the breeding season (Cramp, 1992; ICO, 2010). Thus, the Chiffchaff seems to move through the area largely by means of short bouts of flight interspersed with brief stopovers (see also below). Fattening prior to cross the Mediterranean seems to be limited even in N Morocco.

Stopover

The proportion of birds remaining at ringing sites is low and the mean minimum stopover length is only 3-5 days in most areas (table 2, fig. 5). There are no retraps from N Morocco in spite of the relatively large sample size. Birds are unable to gain mass in any area and fuel deposition rates are only marginally significant in the dry Balearics (negative) and the wet Balearics (positive) when considering retraps of more than one day. Stopover length is significantly longer in Catalonia and the wet Balearics than in the dry Balearics, moreover birds staying in the first two of these areas do not have significantly lower initial body mass than those not trapped again (as is the case in the dry Balearics). Birds from Els Columbrets seem to act in a similar manner to the dry Balearics; however, retraps are also too scarce at this site to be conclusive. The presence of wintering birds early in the season may explain part of these site-related differences, since they are common in Catalonia and the wet Balearics and all but absent from the other areas. Using only data from the standard period (16 April to15 May), when the vast majority of captures undoubtedly involve migrants, the pattern of fuel deposition –but not stopover length– shows similar but not significant differences (albeit with a much smaller sample size: 63 retraps in the dry Balearics *vs.* 19 in Catalonia). Data, however, show again that at isolated sites with unsuitable habitats birds that stay tend to be in poorer initial body condition, indicating that these sites do not offer good opportunities for refuelling.

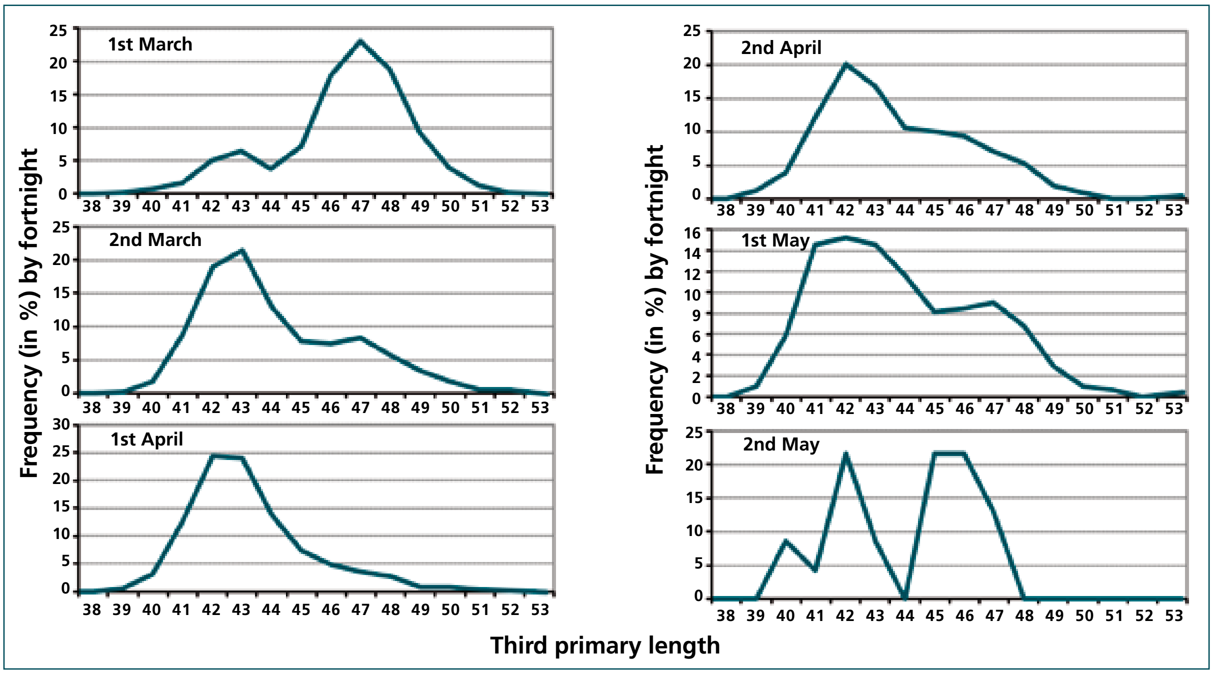


Figure a. Frequency distribution of the third primary length in fortnightly periods.

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

	n	Wing	Third primary	Body mass	Fat score
Catalonia	2,187	58.3 ± 3.1 (52.0-68.0)	45.1 ± 2.6 (39.0-54.0)	7.5 ± 0.8 (4.8-12.5)	2.7 ± 1.2 (0-6)
Columbrets	661	58.2 ± 3.5 (50.0-69.5)	44.7 ± 2.9 (39.0-54.5)	7.0 ± 0.8 (5.0-9.9)	1.2 ± 1.1 (0-6)
Balearics (dry)	3,157	56.7 ± 2.9 (50.0-69.0)	43.8 ± 2.4 (39.0-55.0)	7.1 ± 0.8 (4.6-13.6)	2.5 ± 1.2 (0-8)
Balearics (wet)	139	57.8 ± 3.1 (51.0-65.5)	44.6 ± 2.4 (39.0-51.0)	7.5 ± 0.8 (5.3-9.8)	2.3 ± 1.1 (1-5)
Chafarinas	6		44.8 ± 1.8 (42.0-47.0)	7.3 ± 1.0 (6.3-9.1)	1.5 ± 1.9 (0-5)
N Morocco	82	57.7 ± 3.0 (51.0-64.0)	43.9 ± 2.5 (39.0-51.0)	7.6 ± 1.0 (5.0-10.3)	2.6 ± 1.4 (0-6)
S Morocco	43	57.9 ± 2.8 (54.0-64.0)	43.8 ± 2.2 (40.0-48.0)	7.6 ± 1.2 (5.0-10.3)	2.8 ± 1.5 (1-7)

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	-0.06 ± 0.04 (299)	-0.08 ± 0.13 (30)	-0.12 ± 0.05 (243)	0.09 ± 0.11 (20)		
Retraps >1 day	-0.01 ± 0.03 (214)	-0.04 ± 0.10 (18)	-0.05 ± 0.04 (130)	0.04 ± 0.04 (18)		

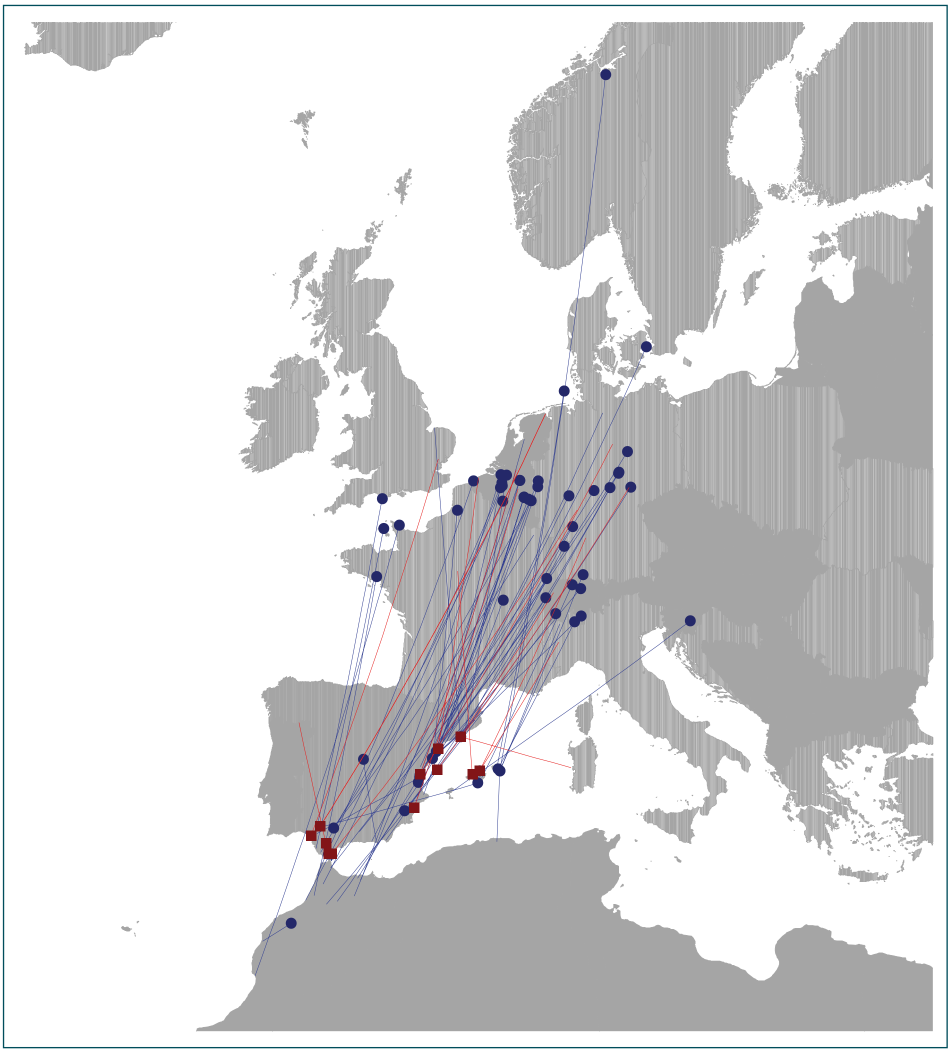


Figure 1. Map of recoveries of birds captured in the study area during the study period (March to May).

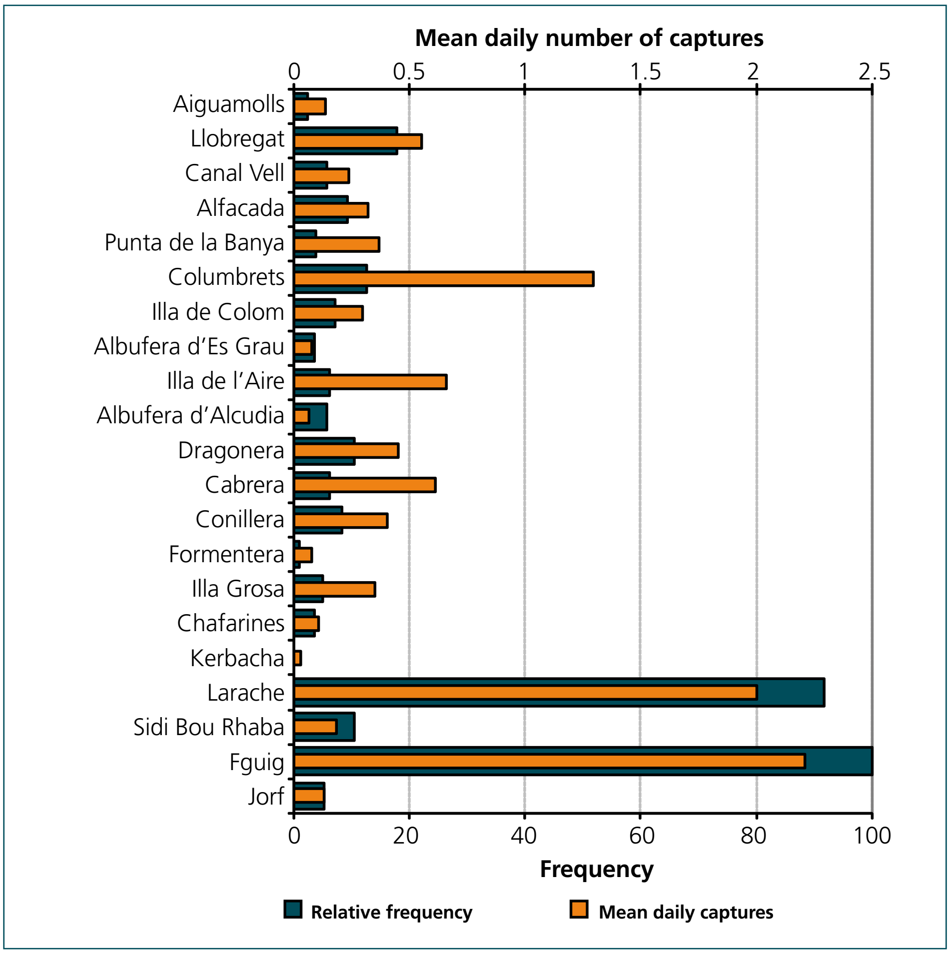


Figure 2. Relative frequency of captures and mean daily numbers according to site during the standard period (16 April to 15 May).

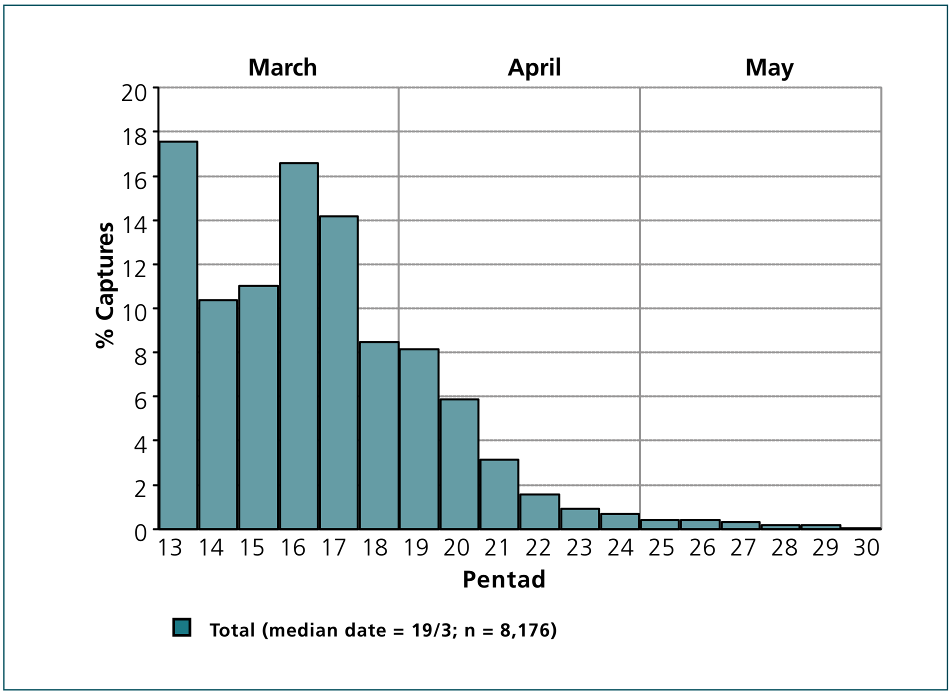


Figure 3. Frequency of captures during the study period.

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

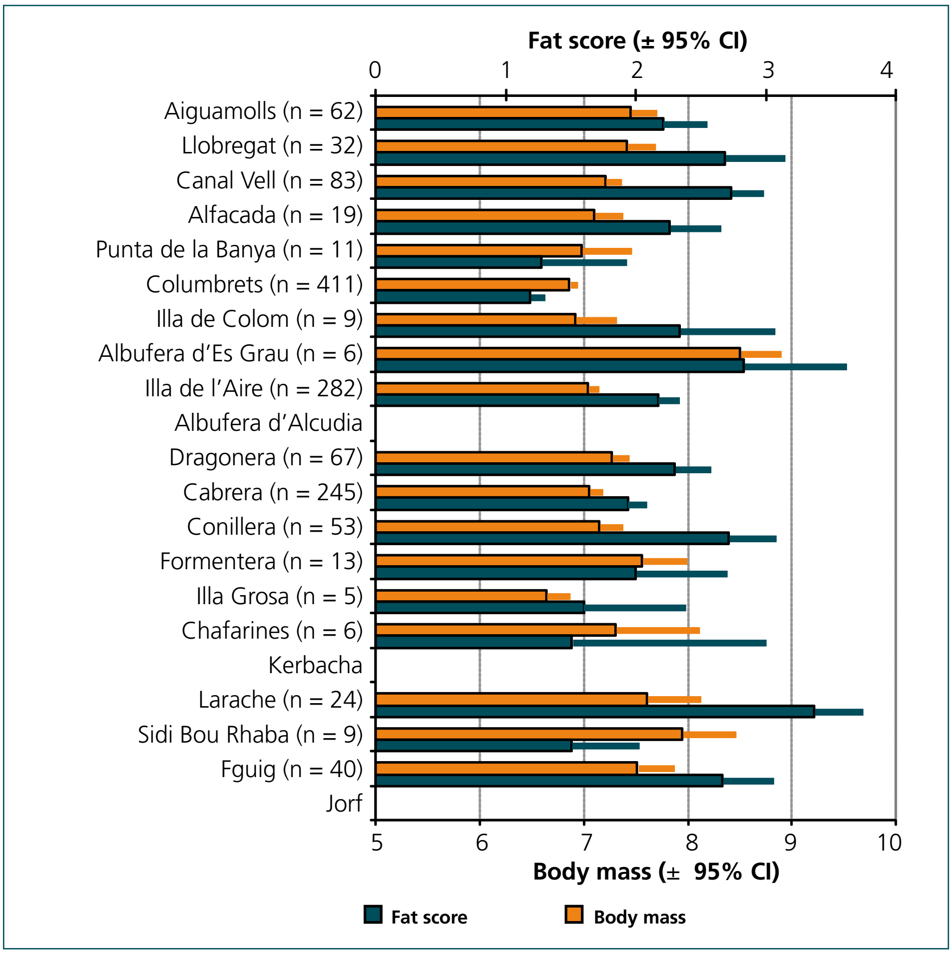
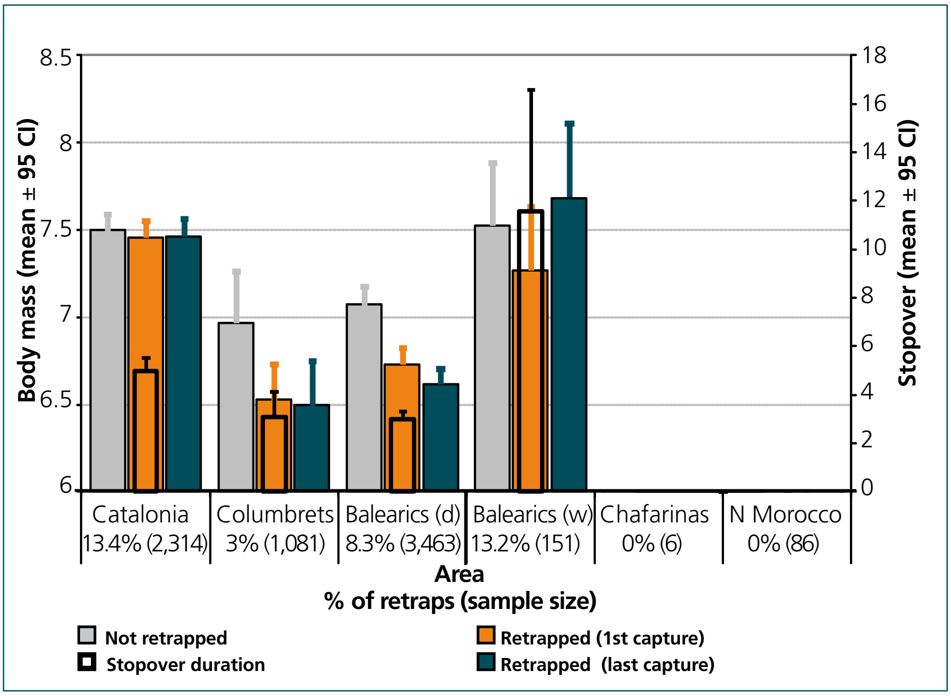


Figure 5. Variation in body mass by trapping status, minimum stopover length and frequency of retraps according to area.



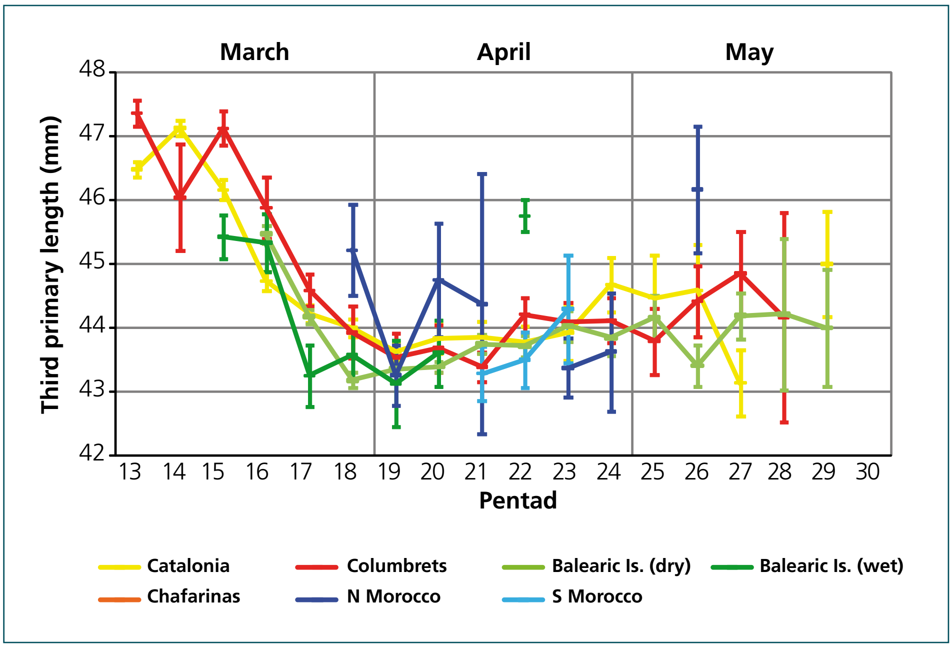


Figure 6. Temporal variation of third primary length according to area.

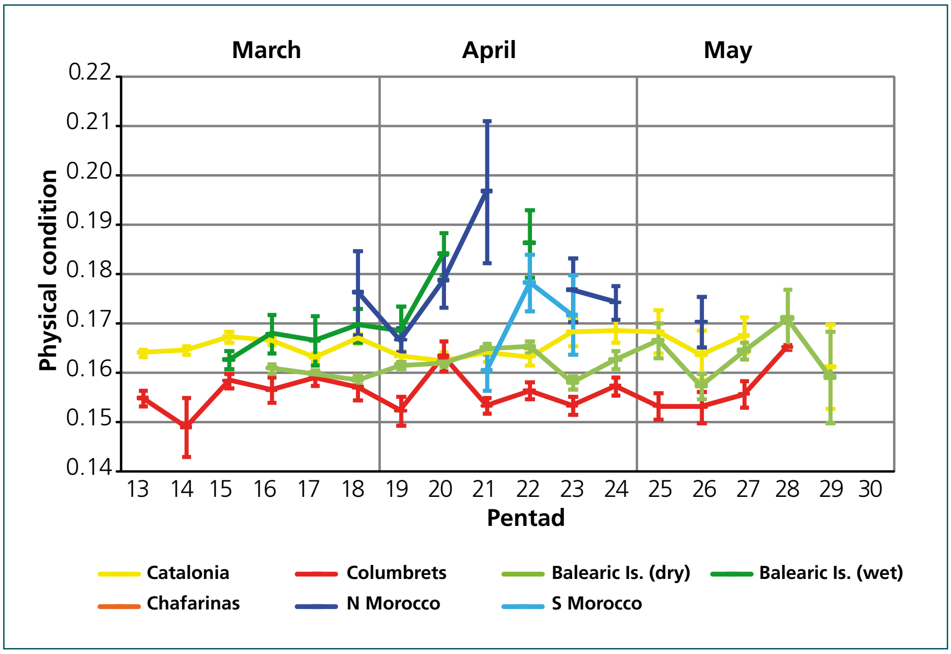


Figure 7. Temporal variation of physical condition according to area.

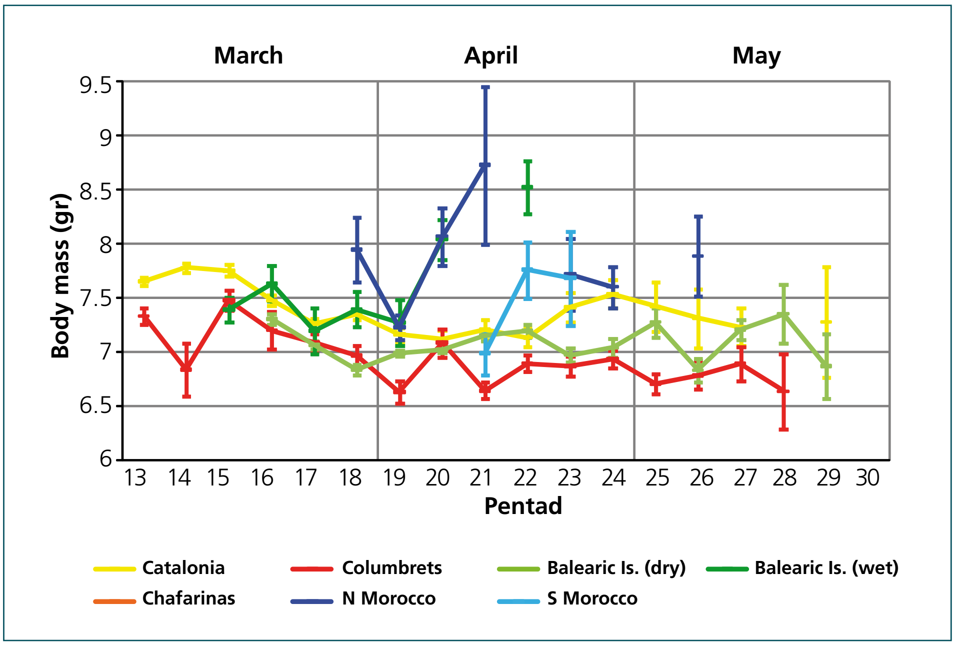


Figure 8. Temporal variation in body mass according to area.

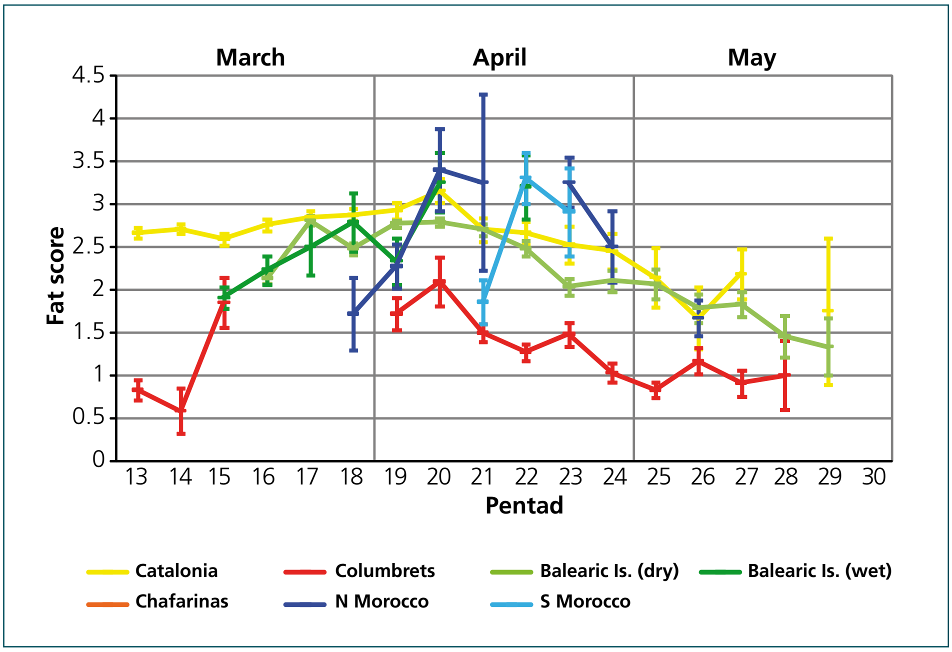


Figure 9. Temporal variation in fat score according to area.