Sitta 1988, 2: 99-103

Biometry of the rock bunting Emberiza cia in North Western Italy

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RIASSUNTO

Biometria dello zigolo muciatto *Emberiza cia* nell'Italia nordoccidentale

Nel periodo 1977-86, 356 zigoli muciatti sono stati catturati in due stazioni d'inanellamento dell'Italia nordoccidentale; la prima, Pietraporzio (1700 m), è sita nelle Alpi Marittime, in un'area riproduttiva, mentre la seconda, Baldissero d'Alba (300 m) è una zona di svernamento a 40 km dalla più vicina zona riproduttiva.

Vengono qui presentati i dati biometrici riguardanti il peso, la lunghezza delle ali, della terza primaria, della coda, del tarso e del becco. I valori misurati di ali e coda ricoprono uno spettro leggermente più ampio di quelli in letteratura, mentre i valori inerenti al becco, al tarso ed al peso superano quelli precedentemente noti.

La lunghezza delle ali può essere utilizzata come criterio per determinare il sesso: uccelli che superino gli 82 mm sono maschi, mentre al di sotto di questa taglia possono essere sia maschi sia femmine.

Il peso dello zigolo muciatto non varia significativamente durante il periodo autunnale, come si sarebbe atteso per gli uccelli che non si sottopongono a lunghe migrazioni.

Alcuni uccelli mostrano fedeltà all'area di svernamento, ritornando nella stessa località anno dopo anno.

The rock bunting *Emberiza cia* is a species with paleartic distribution, present and regularly breeding on mountain reliefs of NW Italy, our study area (Mingozzi, Boano & Pulcher, in press).

During the winter season birds do not perform a veritable migration, but altitudinal displacements at short radius, which allows them to reach wintering areas in hill or on the plain.

Lack of biometric data concerning populations breeding or wintering in NW Italy encouraged us to undertake this study, founded on trap by means of nets and ringing. Data on wintering area fidelity were also obtained.

MATERIALS AND METHODS

Biometric measures were taken from 114 of 356 birds caught and ringed from 1977 to 1986 at

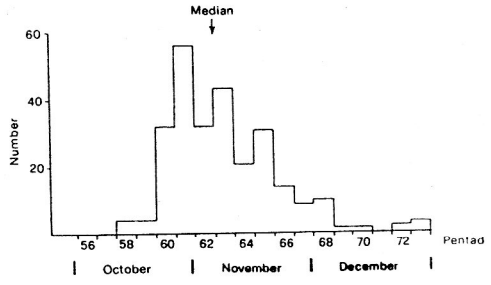

Figure 1. The captures distribution of 263 rock buntings caught at Baldissero d'Alba, 1977-1983.

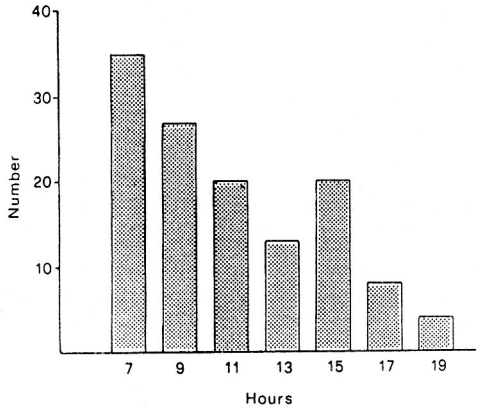

Figure 2. Number of captures at two hours intervals.

two sites in Piemonte (NW Italy); the first locality is situated at 1700 m a.s.l. in the region of Pietraporzio in the Maritime Alps, the second one at 300 m on the hill of Roeri, in the region of Baldissero d'Alba.

Ringing was undertaken in late august at Pietraporzio; nets were placed on typical breeding sites, characterized by dry and pendent soil, with arboreal and shrub vegetation interrupted by rocky apparitions. Since in this period displacements towards wintering areas have not yet begun (Schifferli *et al.*, 1980, Géroudet, 1980, Bocca & Maffei, 1984, Jenni, 1984) birds caught are local breeders.

The ringing site of Baldissero d'Alba is situated in a wintering area at least 40 km from the nearest reproductive zones; this site includes tilled grounds, vineyards and orchards, low shrubs.

The time spent in the wintering area protracts from October to March, but our capturing efforts occurred mainly during the period October-December. As shown in Fig. 1 the median data was reached in November.

Most birds were caught early, before 7 a.m., then rock buntings activity reach a second maximum in the afternoon (Fig. 2).

The "maximum chord" method (Spencer 1982) was used for measuring wing-length. Wing, third primary and tail were measured to the nearest millimeter, bill and tarsus to 0.5 mm accuracy, weight to 1 g accuracy.

According to Svensson (1984) and Busse (1984)

Table 1. Biometric measure of the rock bunting (*: see text for extreme values).

	Males			Females		
	Mean	SD	(N)	Mean	SD	(N)
Wing (mm)	81.4	2.66	(39)	77.1	1.68	(44)
Tail (mm)	75.6	2.61	(36)	72.1	1.78	(38)
	Males and females					
Bill (mm)	13.2	1.36	(65) - range 10.5-16 *			
Tarsus (mm)	20.3	1.10	(63) - range 18-23			
Weight (g)	22.2	1.61	(97) - range 19-28			

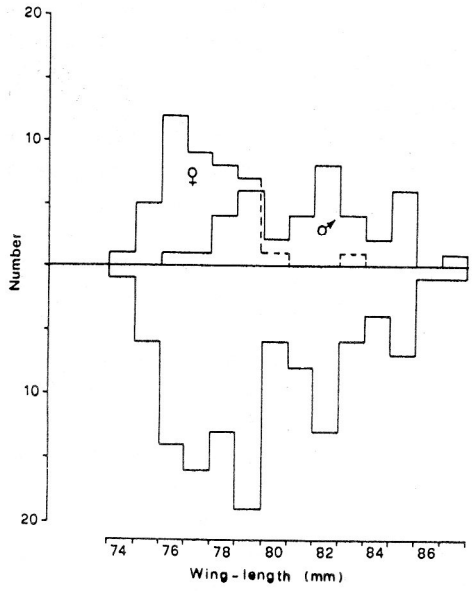

Figure 3. The wing-length distribution of 83 rock buntings of known sex (above) and 114 fully grown rock buntings (below).

age was determined by examining iris colour, streak on upper parts, white and rounded tips to rectrices.
Sex was stated only on colours of lores and head stripes, without considering wing measurements. Individuals having doubtful head-pattern were not sexed.

RESULTS

The distributions of measurements found for the trapped birds is given in Table 1.

(a) Wing and third primary-length (Fig. 3). We have not found differences of the biometric measures between the yearlings and the adults. Females wing-length appears more gathered, while the one of the males has a wider spread distribution. The irregular distribution, with several maxima, of the males measurements is due mainly to sampling, but also to the presence of individuals with highly abraded feathers in August, when the adults have not started moulting.

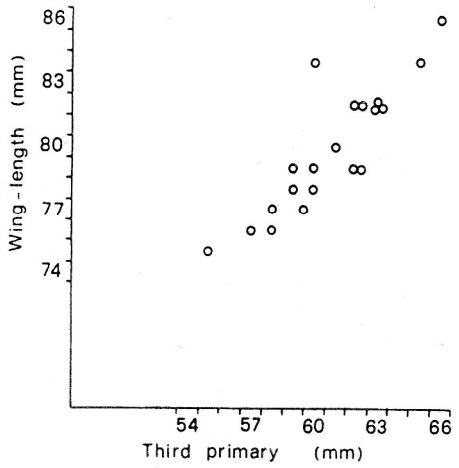

Figure 4. The correlation between wing-length and third primary-lenght (N = 20).

Wing measurements, executed by means of "maximum chord" method, appear to be reliable, with a highly significant correlation ($r = 0.876$; $P < 0.001$) with measure of the third primaries (Fig. 4).

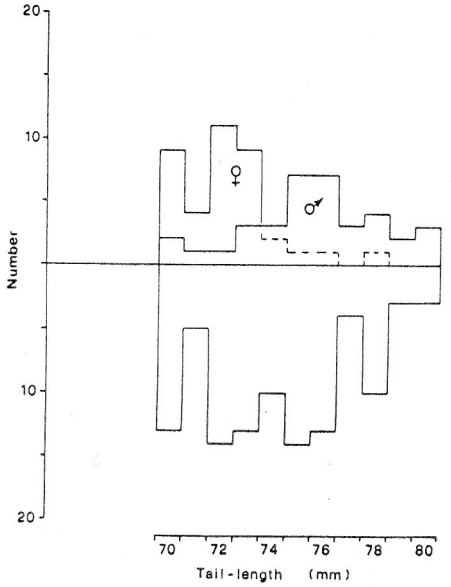

Figure 5. The tail-length distribution of 74 rock buntings of known sex (above) and 102 fully grown rock buntings (below).

Wing-length can be calculated from third primary through the formula :

W.l. = 0.98 T.p. + 20.5

[W.l. = Wing length (mm), T.p. = Third primary (mm)]

(b) Tail length. We noticed that, also for the tail, there was a wide variation in values for the males (Fig. 5), while that of the females covers a less wide range.
In some bird species it is possible to get a male-female separation drawing a correlation-chart (e.g. Busse, 1984) based on measurements of two biometric parameters, but for the rock bunting only wing measurements can be utilized as sex-criterium: birds having wings greater than 82 mm are males, but under 82 mm can be either male or female.

(c) Bill, tarsus and weight. We have not observed significative differences between youngs and adults or males and females (see discussion concerning large measures of bill).

The analysis of the weight in late summer and early autumn does not reveal significative differences (Tab. 2). Rock bunting is a species accomplishing only "altitudinal migrations" (Campbell & Lack, 1985) avoiding long migrations. As expected birds do not accumulate fat, necessary to supply energy during long migrations (see e.g. Perrins & Birkhead, 1983).

(d) Wintering area fidelity. Seven cases of birds successively caught in the same wintering area, far from the nearest reproductive sites (Tab. 3), suggest a year to year fidelity to the wintering area.
The most noticeable case regards one individual retrapped nearly four years later in the same zone.

DISCUSSION

As some authors pointed out (Géroudet, 1980, Niethammer, 1937, Svensson, 1984, Witherby, 1920, Arrigoni, 1929) the wing of the male rock buntings covers a different range in respect to

Table 2. The weight of 94 rock buntings during four months (following reproductive period).

	Weight (g)	
August	N = 47	Mean ± S.D. = 22.2 ± 1.6
September	N = 13	Mean ± S.D. = 23.2 ± 1.2
October	N = 16	Mean ± S.D. = 21.5 ± 1.0
November	N = 18	Mean ± S.D. = 21.7 ± 1.3

No statistical differences among months (Kruskal-Wallis test for analysis of variance).

Table 3. Some cases of wintering area fidelity. Data from Baldissero d'Alba ringing site.

1° - Bird caught 13.02.77 and retrapped 19.11.80, at about 4 km distance (3 years + 10 months later).
2° - Bird caught 6.12.78 and retrapped 21.11.79 (1 year later).
3° - Bird caught 18.11.79 and retrapped 20.11.81 (2 years later).
4° - Bird caught 3.12.79 and retrapped 26.10.80 (11 months later).
5°, 6°, 7° - Birds caught in october/nobember and retrapped 6-11 days later.

the females, higher values being reached only by the former, and lower ones by the latter.
Nevertheless data regarding our populations shows a greater superposition of values than the data recorded by Svensson or Groh (females 74-80 or 71-80, males 78-87 or 76-87) and, moreover, by Géroudet, Niethammer and Witherby (females 75-8l, males 81-85). Our data, instead, agree perfectly with the values established by Arrigoni (females 73-82, males 76-86), bearing in mind the necessity to increase the recorded measurements to counterbalance both diversity in measure method (flattened wing) and shrinkage in skin respect to the live birds.
The tail measurements are not different in respect to the ones established by other authors, but include a slightly wider range.
The data concerning bill, tarsus and weight are peculiar, and also include values clearly higher in respect to the ones supplied by Géroudet and Witherby or Arrigoni (bill 10-11 mm, tarsus 18-20 or 19-21 mm, weight 19-21 g).
Nevertheless it must be stated that it is difficult to measure rock bunting's bill, as it is not easy to reper the passage zone between bill and skull; the extreme values of 15-16 mm, therefore, are probably due to errors in repering the bill-skull boundaries.
The birds recaptured the following years on the same wintering area suggest a fidelity, to which regard there has been little previous data (Groh, 1982). As reported in Lebreton (1977) concerning the displacements in Rhône-Alpes region "nous ignorons en fait si ces mouvements sont regulier, soumis aux aléas meteorologiques, ou s'inscrivent dans le cadre des invasions manifestées par divers Passereaux alpestres".

ACKNOWLEDGEMENTS

We thank Giovanni Boano for his comment and helpful suggestions in reviewing the manuscript, Ettore Molinaro, director of Museo Civico di Bra, B. and R. Tibaldi, L. D'Addio, C. Grillo, A. Peano, B. Vaschetti for help during ringing activity, Costanzo and Margherita Ruella for permission to work at Baldissero d'Alba ringing site.

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