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Measurements and moult of Ruffs *Philomachus pugnax* wintering in West Africa

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Summary

During three ringing expeditions, a total of 1989 Ruffs were caught in Senegal from 1985 to 1988; a fourth expedition caught 105 Ruffs in northern Cameroon (Lake Chad basin) in 1991. Measurements of wing, bill and tarsus and other factors such as colour of legs are given. In Senegal about 25% of first year females and about 33% of first-year males were moulting primary no. 10 (numbering descendantly); one female even moulted primary 6 in its first winter.

Résumé

De 1985 à 1988, au cours de trois séjours consacrés au baguage, 1989 Combattants variés *Philomachus pugnax* ont été capturés au Sénégal; en 1991 une autre expédition a permis la capture de 105 dans le nord du Cameroun (basin du Lac Tchad). Les mesures d'aile pliée, de bec et de tarse (ainsi que la couleur des pattes) sont indiquées. Au Sénégal, environ 25% des femelles et 33% des mâles de première année étaient en mue de la 10ème rémige primaire (mue descendante); une femelle présentait même une mue de la 6ème rémige primaire au cours de son premier hiver.

Introduction

The wetlands of West Africa, especially along the River Senegal, the inundation zone of the River Niger in Mali, the Sokoto river in Nigeria and the Lake Chad basin are the most important wintering areas for Ruffs *Philomachus pugnax* (Scheufler & Stiefel 1985). Although Ruffs were investigated by several studies in West Africa (Morel & Roux 1966, Jarry & Roux 1982) few data on measurements and moult have been published (Trolliet 1992). In contrast there are some comprehensive papers

about these topics concerning birds wintering in eastern and southern Africa (Schmitt & Whitehouse 1976, Summers & Waltner 1978, Pearson 1981).

Ruffs have been studied by members of the OAG (ornithological working group) of Münster, Germany at a central European stop-over site since 1969 (OAG Münster 1989a, 1990). To study the spring migration of this species, OAG Münster organized several ringing expeditions to the Senegal delta and the Lake Chad region during the last decade (OAG Münster 1989b, 1991). In this paper we present measurements and analyse moult of the birds captured during the expeditions.

Methods

Three ringing expeditions were carried out in the Senegal delta (partly in cooperation with colleagues from the Dutch Rijksintituut voor Naturbeheer and the French Centre de Recherches sur la Biologie des Populations d'Oiseaux) from 7 Feb to 8 Mar 1985, 15 Jan to 14 Feb 1987 and 4 Nov 1987 to 25 Jan 1988. Another expedition team visited the Lake Chad basin in Cameroon from 21 Jan to 12 Feb 1991. In the Lake Chad basin, birds were caught in swamps and rice fields along the river Logone near Pouss (*c.* 10°50'N, 15°0'E). Ringing sites in Senegal are shown in Fig. 1.

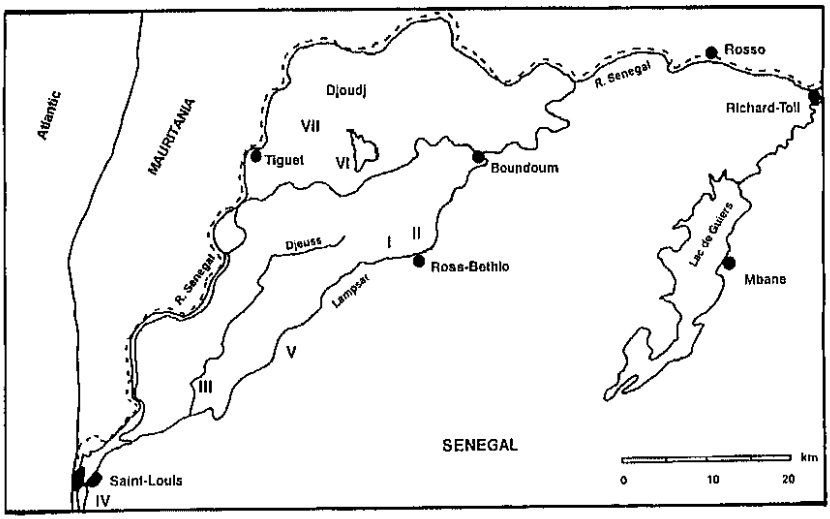

Figure 1. Study area and location of ringing sites (I–VII) in Senegal.

Ruffs were caught at their roosts using mist nets (length 20–40 m, 4 shelves, mesh-width 30 mm), with up to 160 m of net erected in one night. Nets were

controlled almost hourly during the night. Birds were kept in cages and were released shortly after ringing.

Methods of measuring were standardized among members of expedition. We measured wing length (maximum chord to nearest mm), bill length and, in a small sample, tarsus (with vernier calipers to nearest 0.1 mm). Condition of primaries was determined using a scoring system from 0 (old feather) to 10 (new feather); growing feathers were scored according to length.

The expedition members were Birgit Beckers, Albert Beintema, Leo van den Bergh, Burkhard Beyer, Indega Bindia, Thiamnine Bindia, Gerrit Gerritsen, Luc Gizart, Hamidou Hamadou, Hermann Hötker, Thomas Kepp, Thomas Kölsch, Paul Mann, Peter Meininger, Johannes Melter, Gerhard Müskens, Eduard Osieck, Ekhard Reinke, Karfa Boa Sane, Alain Sauvage, Christopher Schmidt, Matthias Scholten, Henk Visser and Joke Winkelman.

Results and discussion

We caught 1989 Ruffs in Senegal (710 in 1985, 1090 in 1986–7, 189 in 1987–8) and 105 in northern Cameroon.

Male Ruffs are much bigger than females, so sex can normally be determined. Age can be determined by plumage colour, leg colour (Fig. 2) and moult characters (Pearson 1972, Tree 1974, Schmitt & Whitehouse 1976, Tréca 1979). Using these features we were able to age all birds except one male and two females. Sex and age of birds ringed in both sites has already been analysed in detail (OAG Münster 1996).

Wing length

Wing length is one of the best measurements to sex birds in winter (Fig. 3). Measurements from Senegal fit well with results presented by Trolliet (1992). Ruffs in Cameroon and especially in South Africa (Schmitt & Whitehouse 1976) seem to have shorter wings than in Senegal, but at least for South Africa the difference might also result from methodological and seasonal effects.

There was a small difference in wing length of adults and first year birds both for males and females (Table 1) in Senegal. Probably because of more abrasion of primaries, juveniles have shorter wings than adults (but see moult, below). Adults moult their primaries during autumn migration (at stop-over sites) or after arriving in Africa (Koopman 1986, Pearson 1981, this study) so that their flight feathers are relatively fresh in winter.

Bill length

Bill length of adult and first year birds do not differ (Table 1). Bill length of males and females from Senegal show a wider overlap than wing length (Fig. 4), preventing

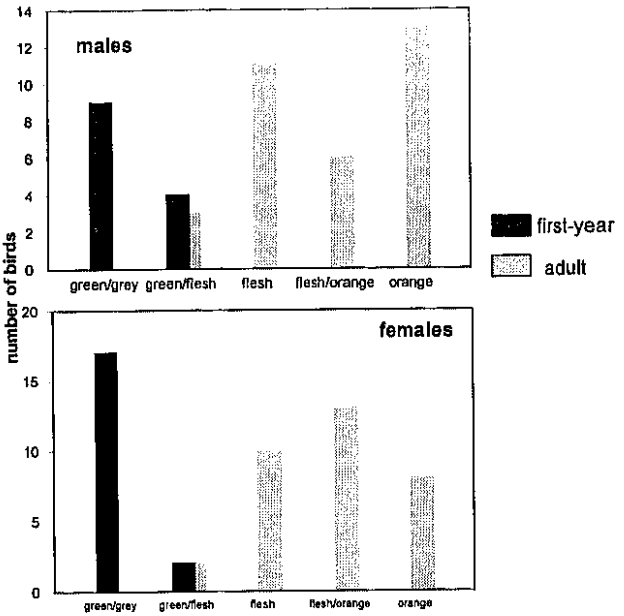

Figure 2. Leg colour of Ruffs caught in northern Cameroon, aged by plumage and moult features.

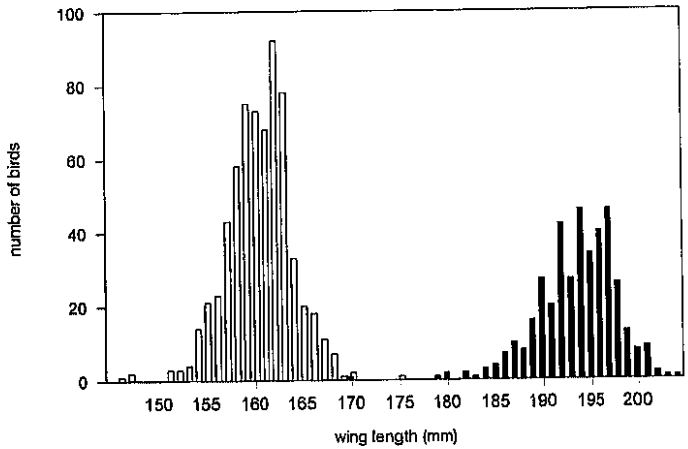

Figure 3. Frequency distribution of wing lengths of adult Ruffs caught in Senegal. White: females, black: males.

Table 1. Measurements of Ruffs from Senegal and northern Cameroon. Figures are: mean ± standard deviation (n).

	Adult males	Adult females	First-year males	First-year females
Wing				
Senegal	193.7±4.2 (396)	160.5±3.4 (657)	189.6±4.5 (96)	158.5±3.9 (254)
Cameroon	190.9±4.0 (33)	159.4±2.7 (34)	185.0±3.4 (11)	156.9±5.5 (19)
Bill				
Senegal	34.7±1.4 (402)	30.3±1.2 (690)	34.1±1.4 (128)	30.3±1.2 (317)
Cameroon	33.9±1.1 (33)	29.8±1.2 (35)	33.3±1.2 (15)	30.2±1.4 (22)
Tarsus				
Senegal	50.3±1.8 (20)	42.8±1.5 (45)	48.3±1.6 (4)	42.6±2.1 (11)

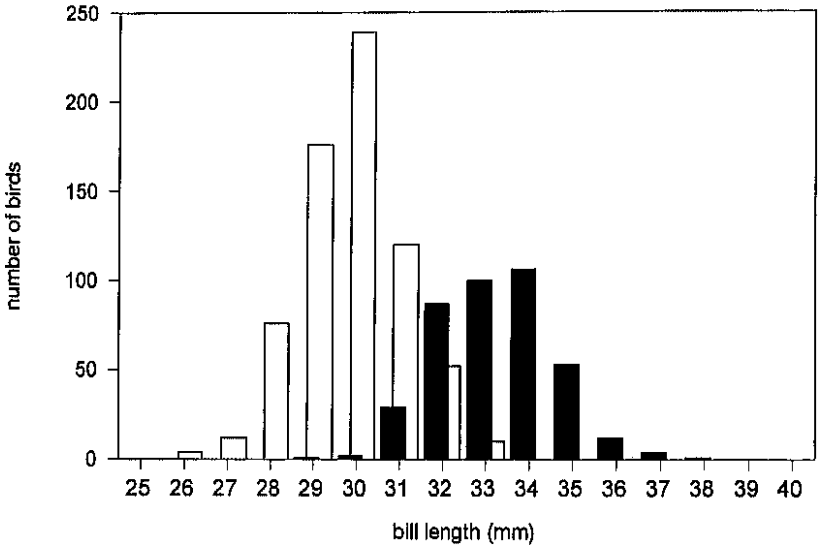

Figure 4. Frequency distribution of bill length of adult Ruffs caught in Senegal. White: females, black: males.

use of this measurement for sexing. Bill lengths are within the range reported in other studies (*e.g.* Schmitt & Whitehouse 1976, Scheufler & Stiefel 1985).

Tarsus length

Tarsus (tarso-metatarsus) was measured only on a small sample in Senegal (Table 1). There is almost no overlap between the sexes: males > 46 mm, females < 46 mm.

Moult

Patterns of adult moult found in our study were very similar to the scheme described from East and South Africa (Schmitt & Whitehouse 1976, Pearson 1981) so we do not report them again.

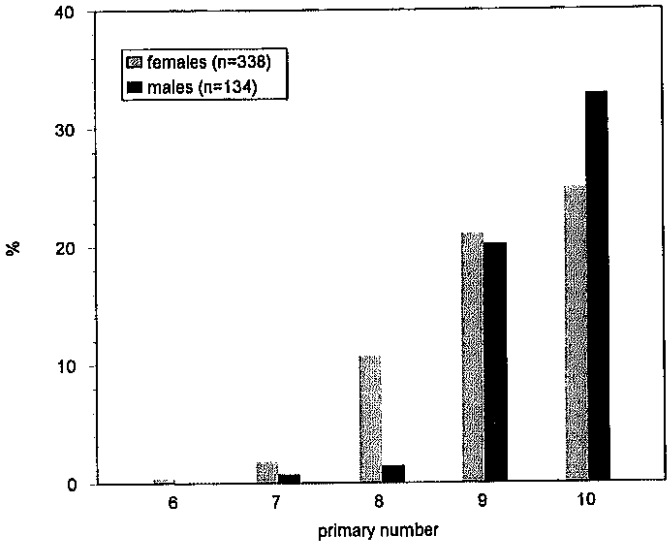

Figure 5. Proportion of first-year birds moulting outer primaries in Senegal.

We also found first-year birds moulting their outermost primaries between January and March. Most birds seem to moult only primaries 9 and 10 (numbering descendantly, Fig. 5). About 25% of females and about 33% of males were moulting P10, rather more than the *c.* 15% reported from East and South Africa (Tree 1974, Schmitt & Whitehouse 1976, Pearson 1981). Females moulted P8 significantly more frequently than males ($\chi^2_1 = 10.87$, $P < 0.001$). There was also one first-year female moulting P6 during winter. So far as we know, this has not been found before.

We speculate that perhaps more birds with new flight feathers migrate to their breeding ground in their first year whereas birds with old primaries mainly stay in Africa in their first summer.

Acknowledgments

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