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Age classes, morphometrics and body mass of Woodcocks (*Scolopax rusticola*) wintering in Central Italy

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Abstract: Sorace A., G. Landucci, P. Ruda & C. Carere (1999): Age classes, morphometrics and body mass of Woodcocks (*Scolopax rusticola*) wintering in Central Italy. Vogelwarte 40: 57–62.

Few information about morphometrics and body mass of Woodcock (*Scolopax rusticola*) are available, all of them obtained from individuals hunted. During five winter seasons (from 1992 to 1997) 421 Woodcock-individuals (39% adults, 22.8% early juveniles, 38% late juveniles), were caught, ringed, measured and their weight taken in a wintering area of Central Italy. Morphometric measures and weight were analysed concerning age class, year, and month of capture. Recoveries are also reported. Juveniles had shorter tails and wing compared to adults but bill length did not differ. Birds weighted more in December and January. The birds seem to belong to the northeast Europe population and the recovery of several individuals in subsequent winters suggests a winter site fidelity.

Key-words: Woodcock (*Scolopax rusticola*), morphometrics, age-ratio, wintering area, recoveries.

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1. Introduction

The Woodcock (*Scolopax rusticola*) is a monotypic species with a widespread distribution in Europe and Asia. Most of the populations are migratory and winter throughout Western and Southern Europe, but particularly in France, Spain, the United Kingdom and Italy (Glutz von Blotzheim et al. 1977, Cramp & Simmons 1983). The wintering population of Woodcock has declined substantially in recent years, likely because of hunting pressure (Kalchreuter 1983, Spanò 1993, Tucker & Heath 1994), and this results in a relevant interest on its general biology, population dynamics and management (Fadat 1986, 1997, Mc Kelvie 1990, Gossmann et al. 1994).

Few informations about morphometrics and body mass of this species are available and data on populations wintering in Southern Europe are more scanty (Glutz von Blotzheim et al. 1977, Cramp & Simmons 1983, Spanò 1984, Silvano & Spanò 1994), all of them obtained from individuals hunted (Glutz von Blotzheim et al. 1977, Cramp & Simmons 1983, Fadat 1997).

In this study we present data on morphometrics, body mass and recoveries of birds caught in Central Italy during winter. The aims were: (i) to determine age structure within and between different years; (ii) to analyse variation in body mass during winter; (iii) to assess the provenience of the population.

2. Material and Methods

Birds were captured in the nocturnal feeding areas with a small net (diameter : 140 cm) provided with a 7 m length handle after illumination by a torch light was pointed to a single bird. Capture sessions were carried out on a weekly basis from November to February during five consecutive winter seasons (1992–1997) in the Presidential estate of Castelporziano, a 6000 ha woodland area (41°44' N, 12° 24' E). Previous direct nocturnal observations and other clues (faeces, tracks) allowed to select the meadows where Woodcocks usually move to feed preferentially after sunset (Landucci & Ruda 1997).

For each individual we recorded the following morphometrics: wing length (maximum chord); length of third primary; bill length (from tip to the farthest point of exposed nonfeathered culmen ridge); total head length (from bill tip to back of skull, Green 1980); nalospi (from the anterior edge of the nostril opening to bill tip,

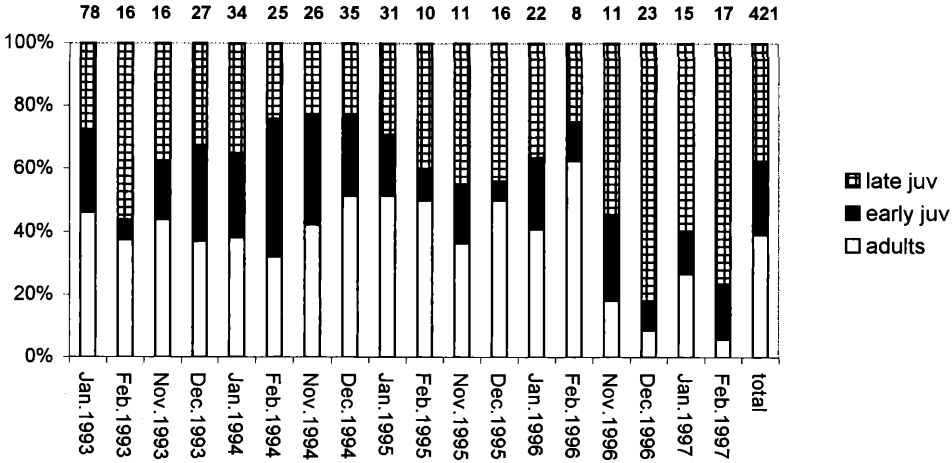

Fig. 1: Monthly percentage of adults, early and late juveniles trapped during the study (n is given on the top).
Abb. 1: Prozentsatz von Adulten, jungen und älteren Juvenilen.

PRATER et al. 1977); tarsus length; foot length (from the back of the tarsal joint to tip of longest toe, PIERSMA 1984); tail length. Data on third primary were taken only in the last winter season. Measures were taken by the same two ringers who previously carried out a reciprocal random control on accuracy. In 94% of the tests (N = 94), measurement differed within the limits of accuracy (± 0.5 mm for tarsus and bill; ± 1 mm for tail and wing). Body mass was measured by an electronic balance (Sartorius 1200) to the nearest 0.1 g. Three age classes (adult, early juvenile, late juvenile) were assessed both through observation of colour patterns in the greater coverts and the tertials and examining the contrast between greater coverts and primary coverts (FADAT 1968, CLAUSAGER 1973, PRATER et al. 1977, CRAMP & SIMMONS 1983). We assumed that late juveniles originate from North-eastern Europe (FADAT 1997). Sex was not determined.

Data on age classes were analysed by χ^2- and Wilcoxon-tests. Data on morphometrics and body mass were analysed by parametric analysis of variance (BMDP statistical software) considering age, winter season, and month as main effects or interaction of effects. Multiple comparisons were performed by the Tukey's honestly significant difference (HSD) test. In part of the analyses data collected during the first winter season were excluded due to the lack of data in November and December.

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3. Results

A total of 421 individuals were caught and measured: 97 were early juveniles (22.8%), 160 late juveniles (38%) and 166 adults (39%, see Fig.1 for monthly variation). The difference between years was significant ($\chi^2_4 = 24.6$; $P < 0.001$), due to the strong decrease of the number of adults in the last winter season (last year *vs* others: $\chi^2_1 = 20.2$; $P < 0.001$). Excluding this season the proportion of adults increased to 43.9% and the yearly differences were not significant ($\chi^2_4 = 3.0$, NS). In each year we did not find any difference in the proportion of adult between months or within a given month. In all the years considered, except for 1997, the number of individuals caught decreased in February (Fig. 1).

In most months late juveniles were more common than early juveniles (Wilcoxon test: T = 23.5, n = 18, $P < 0.01$, Fig. 1). The proportions of these two classes in the whole study period showed some differences ($\chi^2_4 = 16.6$; $P < 0.01$), the proportion of late juveniles clearly increased in the last two winter seasons (years I–III *vs.* IV–V : $\chi^2_1 = 13.5$; $P < 0.01$).

Table 1: Morphometrics and body mass (mean ± SD., range and sample size) in the three age classes. ** P < 0.01; *** P < 0.001.

Tab. 1: Morphometrische Daten und Körpermasse (Mittelwert ± SD, Min.-Max., Stichprobengröße) in den drei Alterskategorien. ** P < 0.01; *** P < 0.001.

	Adult	Juvenile early	Juvenile late	Juvenile total	Age effect
Body mass	319.5 ± 27.62	315.2 ± 25.86	308.7 ± 24.87	311.1 ± 25.40	**
(g)	260–405	260–367	222–360	222–367	
	166	97	160	257	
Wing	205.7 ± 5.34	203.4 ± 4.94	204.0 ± 4.98	203.8 ± 4.96	***
(mm)	191–221	193–214	190–216	190–216	
	144	83	148	231	
Third primary	135.0 ± 4.56	132.4 ± 2.13	133.1 ± 3.42	133.0 ± 3.22	N.S.
(mm)	128–142	128–135	126–142	126–142	
	8	8	35	43	
Bill	74.9 ± 3.33	74.9 ± 3.6	74.5 ± 3.61	74.7 ± 3.59	N.S.
(mm)	67–85	68–90	66–83	66–90	
	144	83	148	231	
Head- length	112.3 ± 4.17	112.3 ± 4.00	111.6 ± 5.77	111.8 ± 5.21	N.S.
(mm)	102–128	104–126	61–126	61–126	
	143	82	148	230	
Nalospi	63.6 ± 3.04	63.1 ± 4.75	63.5 ± 5.08	63.37 ± 4.95	N.S.
(mm)	55–71	34–74	56–108	34–108	
	120	76	128	204	
Tarsus	37.8 ± 1.74	37.7 ± 1.70	37.56 ± 1.33	37.6 ± 1.48	***
(mm)	28–42	32–42	33–41	32–42	
	122	76	129	205	
Tail	81.8 ± 3.40	79.7 ± 3.65	79.3 ± 3.1	79.4 ± 3.31	***
(mm)	74–90	72–86	73–88	72–88	
	109	69	117	186	
Foot	80.2 ± 2.90	80.0 ± 3.02	79.8 ± 2.68	79.9 ± 2.80	N.S.
(mm)	74–91	71–87	73–86	71–87	
	143	82	147	229	

Table 2: Probabilities for multiple comparisons. ** P < 0.01; *** P < 0.001.

Tab. 2: P-Werte für multiple Mittelwertvergleiche.

	Tukey test		
	body mass	wing	tail
Adult – early juv	N.S.	**	**
Adult – late juv	**	**	***
Early juv – late juv	N.S.	N.S.	N.S.

Adults were larger than juveniles (Tables 1 and 2), since wing and tail were longer (wing: $F_{2,359} = 7.2$, $P < 0.001$; tail: $F_{2,286} = 15.6$, $P < 0.001$) and body mass was higher ($F_{2,359} = 6.1$, $P < 0.01$). For the other parameters we did not find any significant effect. Without considering the last winter season (because of scarcity of adults data), we found a significant effect of the month on body mass; in fact in December and January body mass clearly increased ($F_{3,249} = 6.4$, $P < 0.001$, Fig.2). All paired comparisons were significant, except for December–January and February–November (Tukey test for unequal N: Nov–Dec: $P < 0.01$; Nov–Jan: $P < 0.001$; Jan–Feb: $P < 0.001$; Dec–Feb: $P < 0.01$). For wing and tail we did not find any significant effect.

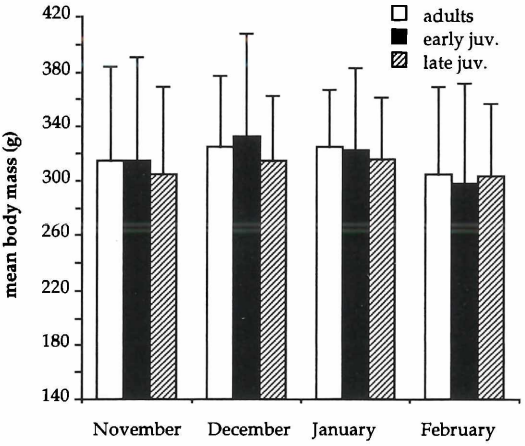

Fig. 2: Monthly variation of body mass in the three age classes.
Abb. 2: Variation in der Körpermasse in den drei Altersklassen.

We never caught animals already ringed by others. In total, 17 Woodcocks have been recovered in Italy (11 within a 100 km radius from the study area), two in Russia, two in Hungary, one in Croatia and one in Austria, all of them hunted (Fig. 3). 1.1% of the Woodcocks caught in the study area were recovered after one year, 0.3% after two years and 0.5% after three years (mean recovery time: 415.6 ± 323.8 days). The percentage of individuals we recovered in the same winter season in our study area was 2.1% (range 0.97% – 3.33%). Site fidelity to the wintering area was proved for seven birds: four of them were recovered after one season, one after two and two after three seasons.

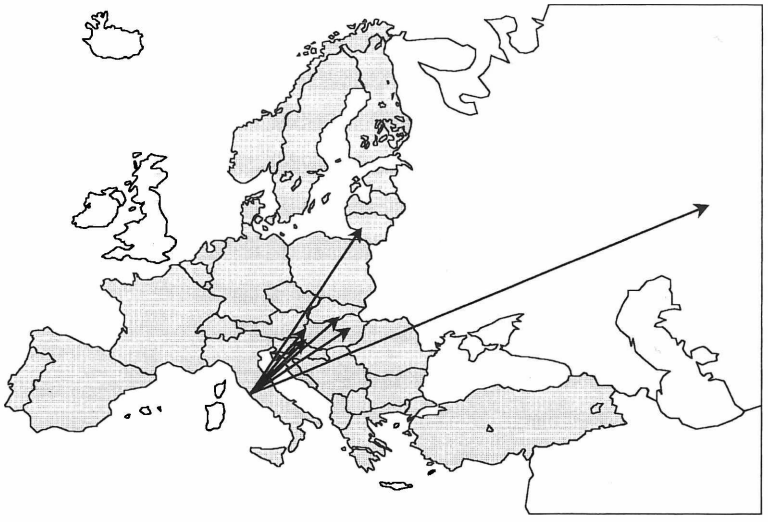

Fig. 3: Recoveries of Woodcocks outside Italy of birds trapped during the study.
Abb. 3: Wiederfunde im Winter beringter Waldschnepfen außerhalb Italiens.

4. Discussion

According to CRAMP & SIMMONS (1983), juveniles had tail and wing shorter than adults. As regards body mass, we found age-related as well as month-related differences, adults being heavier than juveniles and the individuals caught in December and January showing the highest values. GLUTZ VON BLOTZHEIM et al. (1977) reported that the maximal weight is reached between November and January. This could be due to the fact that in November and February migrant individuals, belonging to different population, could stop in the area. However, the same monthly differences were not observed for the wing and the tail. More likely, the observed differences are a consequence of the wintering pause of migratory activity, allowing the birds to recover fat reserves.

Our data show values of wing and bill length higher than those reported by GLUTZ VON BLOTZHEIM et al. (1977) and CRAMP & SIMMONS (1983). The high proportion of late juveniles, together with data on recoveries, would indicate North East Europe as breeding area of the Woodcocks wintering in Central Italy (see methods). This is also in line with the main migration routes (from NE to SW) of the species (GLUTZ VON BLOTZHEIM et al. 1977, KALCHREUTER 1983, CRAMP & SIMMONS 1983, NYENHUIS 1990).

Our results confirm previous data that there is inter-year variation in the ratio early juveniles-late juveniles (FADAT 1997) and juveniles-adults (FADAT 1986, HARRADINE 1986, HIRONS 1986); in Central Italy the proportion of adults is higher than in other Italian areas (SPANÒ & BORGO 1993); there is no evidence of differential monthly passage between juveniles and adults (KREMENTZ et al. 1994, SPANÒ 1997, but see DEVORT 1977). Moreover, Woodcocks show fidelity to the wintering area (BICKFORD-SMITH 1980, WILSON 1983, DIEFENBACH et al. 1990), which in our case occurred also for consecutive years. The very low recovery rate could be suggestive of a high turnover of individuals and/or a high mortality rate. However individuals could give experience in avoiding being trapped by torch light.

5. Zusammenfassung

Altersklassen, Morphometrie und Körpermasse von Waldschnepfen (*Scolopax rusticola*) an einem Überwinterungsplatz in Zentral-Italien.

Bislang gibt es nur relativ wenige Informationen über die Morphometrie und die Körpermasse von Waldschnepfen, und alle Daten stammen von Jägern. Im Verlauf von fünf Wintern (von 1992 bis 1997) wurden 421 Waldschnepfen (39% Adulte, 23% junge Juvenile, 38% ältere Juvenile) in einem Überwinterungsgebiet in Zentral-Italien gefangen, beringt, gemessen und gewogen. Die morphometrischen Daten und die Körpermasse wurden analysiert in Bezug auf Alter, Jahr und Monat. Im Vergleich zu Adulten hatten Juvenile kürzere Schwänze und Flügel. Ein Unterschied in der Schnabellänge wurde dagegen nicht festgestellt. Allgemein lag die Körpermasse im Dezember und Januar am höchsten. Die erfaßten Vögel gehören offenbar zur Nordost-Europäischen Population. Wiederfänge mehrerer Individuen in folgenden Wintern lassen Winterortstreue vermuten.

6. References

Bickford-Smith, P. (1980): Wintering woodcock study in Cornwall. IWRB (WSRG) Newsl. 6: 43–46. * Clausager, I. (1973): Age and sex determination of the Woodcock (*Scolopax rusticola*). Danish Rev. Game Biol. 8: 1–18. * Cramp, S., & K. E.L. Simmons (eds, 1983): The Birds of the Western Palearctic, 3 – Oxford Univ. Press. * Devort, M. (1977): La bécasse en Bretagne. De l'Orée, Bordeaux. * Diefenbach, D. R., E. L Derleth, W. M. Vander Haegen, J. D. Nichols & J. E. Hines (1990): American Woodcock winter distribution and fidelity to wintering areas. Auk 107: 745–749. * Fadat, C.H. (1968): À propos de l'âge des bécasse. La Mordorée 85: 2–4. * Fadat, C.H. (1986): Utilisaton des tableaux de bécasses pour la gestion cynégétique de leurs populations. Proc. 3rd Eur. Woodcock and Snipe Workshop: 96–108. * Fadat, C. (1997): Proposte per la gestione venatoria delle popolazioni di Beccaccia (*Scolopax rusticola*) in Europa. Supp. Ric. Biol. Selvaggina XXVII: 923–939. * Glutz v. Blotzheim, N., K. M. Bauer & E. Bezzel (1977): Handbuch der Vögel Mitteleuropas. VII. Wiesbaden, Akademische Verlagsgesellschaft. * Gossmann, F., Y. Ferrand & C. Bastat (1994): Mortalité hivernale des bécasses de bois en France d'aprés les reprises de bagues.

Proc. 4th Eur. Woodcock and Snipe Workshop, Saarbrücken, IWRB pub. 31: 8–14. * Green, G. H. (1980): Total head length. Wader Study Group Bull. 29: 18. * Harradine, J. (1986): The Woodcock production survey in the United Kingdom and Ireland. Proc. 3rd Eur. Woodcock and Snipe Workshop: 87–91. * Hirons, G. (1986): Some factors affecting age ratios among Woodcock wings collected from hunters in Britain. Proc. 3rd Eur. Woodcock and Snipe Workshop: 92–95. * Kalchreuter, H. (1983): The Woodcock. Verlag Dieter Hoffmann, Mainz, 119 pp. * Krementz, D. G., J. T. Seginak & G. W. Pendleton (1994): Winter movements and spring migration of American Woodcock along the Atlantic coast. Wilson Bullettin 106: 482–493. * Landucci, G., & P. Ruda (1997): L'attività di cattura di Beccaccia *Scolopax rusticola* nella Tenuta Presidenziale di Castelporziano: breve resoconto. Supp. Ric. Biol. Selvaggina XXVII: 951–954. * McKelvie, L. (1990): The book of the woodcock. II Ed. Swan Hill, Shrewsbury (UK). * Nyenhuis, von H. (1990): Zugwege der Waldschnepfe (*Scolopax rusticola*) in Nordwesteuropa. Vogelwarte 35: 208–214. * Piersma, T. (1984): International wader migration studies along the East Atlantic Flyway during spring 1985. Wader Study Group Bull. 42: 5–9. * Prater, A. J., J. H. Marchant & J. Vuorinen (1977): Guide to the identification and ageing of the holarctic waders. BTO Guide n° 17. * Silvano, F., & S. Spanò (1994): Dati biometrici, età e sesso di Beccacce *Scolopax rusticola* dell'Appennino ligure – piemontese (1979–1990). Atti VI Conv. Ital. Orn., Mus.Reg.Sci.Nat. Torino: 391–392. * Spanò, S. (1984): Age distribution of wintering woodcock in Italy. IWBR (WSRG) Newsl., 10: 43–49. * Spanò, S. (1993): Il punto sulla Beccaccia. Ed.Olimpia, Firenze. * Spanò, S. (1997): Stato delle conoscenze sulla biologia della Beccaccia *Scolopax rusticola* nell'ottica di una corretta gestione della specie. * Spanò, S., & E. Borgo (1993): Age-ratio, radio activity and foods of eurasian woodcock in Italy. Proc. 8th Am. Woodcock Symp, U.S. Dpt. Interior, Biol. Rep. 16: 126–130. * Tucker, G. M., & Heath, M. F. (1994): Birds in Europe: their conservation status. Cambridge: BirdLife International (BirdLife Conservation Series no.3). * Wilson, J. (1983): Wintering site fidelity of woodcock in Ireland. Proc. 2nd Eur. Woodcock and Snipe Workshop, Fordingbridge: 18–27.