Publication bias in waders

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Why are some waders better studied than others? We investigated the effects of life-history and ecological traits (population size, conservation status, body mass, wing length, breeding latitude, mating system, and migratory behaviour) on the number of publications in waders. A phylogenetic comparative approach is employed using an unpublished wader supertree. Overall, population size appears to be the most useful predictor of citation. The presence of publication bias may impact upon comparative and meta-analyses. The trend towards studies of taxa with large populations indicates that taxa at risk of local or global extinction may be understudied.

INTRODUCTION

Why do we know more about some waders than others? Oystercatchers, for instance, are popular study organisms of ecologists, whereas other waders such as the magellanic plover are very little studied. We might predict that those taxa that are more common, or that are perceived to have greater evolutionary interest are likely to have a more extensive record in the scientific literature. Some might consider polygynous or polyandrous species to be more intriguing than their monogamous contemporaries, and thus polygynous species may have a greater than expected presence in the literature. Similarly, wader enthusiasts may be more intrigued by migratory species than non-migratory ones.

Publication biases are frequently discussed in the scientific literature (e.g. Dubois & Cezilly 2002, Jennions & Møller 2002). Particular interest has been aroused amongst palaeontologists for whom the quality of the fossil record is a major concern. For example, Koch (1978) demonstrated a trend towards studies of common and biostratigraphically important taxa. Such biases have led to the suggestion that estimates of the diversity of the fossil record are unreliable and are a reflection of the endeavour of systematists rather than a reliable indicator of any biological trend (Sheehan 1977).

It is not yet clear what manner of bias exists across wader studies, nor is it obvious what impact this may have on our understanding of their biology. The focus of our study is therefore to investigate publication bias in waders with respect to a range of life-history and ecological traits, namely, population size, conservation status, body mass, wing length, breeding latitude, mating system, and migratory behaviour. We aim to quantify some of the key variables that may influence the choice of study taxa and present statistical analyses using the method of phylogenetically independent contrasts (Felsenstein 1985, Harvey & Pagel 1991).

MATERIALS AND METHODS

Data and phylogeny

Published wader studies were identified from online searches of Web of Science (WoS). Both the text (i.e. title, abstract and keywords), and title-only options of WoS were searched using the names of 221 species of waders and 16 species of sandgrouse (all of which were included as an outgroup) to give two measures of the publication record of each species since 1980 (the full date range covered by WoS; see Appendix 1). Species names were taken from Monroe & Sibley (1993).

Estimates of population size were taken from del Hoyo *et al.* (1996). Only those taxa for which an estimate of the worldwide population (as opposed to regional or local estimates) is provided, or can be readily calculated, were used.

Conservation status was scored using the following categories listed in Stattersfield & Capper (2000): not globally threatened (1); least concern (2); near threatened (3); conservation dependent (4); vulnerable (5); endangered (6); critically endangered (7); extinct in the wild (8); extinct (9). Of the 237 species considered in this study, 236 fell into one of these nine categories, and only one (*Glareola nordmanni*) is listed as data deficient.

Data for the remaining variables – body size (body mass and wing length), breeding latitude, mating system, and migratory behaviour – are taken from the data sets of Reynolds & Székely (1997), and Székely *et al.* (2000). We used the mean values of body mass and wing length rather than splitting these measurements by sex. Breeding latitude was sub-divided into two variables. Absolute breeding latitude is a measure of the distance (in degrees latitude) of the breeding site from the equator (see Reynolds & Székely 1997). A categorical variable of breeding site was used to split waders into those breeding north of the equator (scored as 1) and

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Table 1. Univariate regression of population size (pop), conservation status (con), body mass (mas), wing length (win), absolute breeding latitude (lat), migratory distance (mig), and mating system (mat) against the number of citations in title-only, and text.

	Title-only			Text		
	r	*F*	*P*	*r*	*F*	*P*
Pop	0.244	5.135	0.026	0.346	10.999	0.001
Con	–0.126	3.617	0.058	–0.196	8.897	0.003
Mas	0.129	2.528	0.114	0.175	4.766	0.031
Win	0.071	0.914	0.340	0.060	0.640	0.425
Lat	0.281	9.266	0.003	0.278	9.074	0.003
Mig	0.369	17.296	0.000	0.371	17.575	0.000
Mat	–0.111	1.823	0.179	–0.136	2.754	0.099

those breeding south of the equator (scored as 0). Social mating system was first collated as a single variable with three categories (polygyny, 1; monogamy, 2; polyandry, 3), and then as a set of two dummy variables each with two categories (Zar 1996): dummy variable 1 consisted of one category for polygynous taxa (1) and one category for monogamous or polyandrous taxa (2). Conversely, dummy variable 2 consisted of one category for polyandrous taxa (1) and one category for monogamous or polygynous taxa (2). The function of the dummy variables was to separate the effects of interest in male-based sexual selection (dummy variable 1) from those in female-based sexual selection (dummy variable 2, Székely *et al.* 2000). Migratory behaviour is the migratory distance measured in degrees latitude between the breeding and wintering ranges (see Reynolds & Székely 1997).

The phylogeny (not shown) is an unpublished supertree of waders incorporating the same 237 species as our data set (see Sanderson *et al.* 1998 for a review, and Pisani *et al.* 2002 for a recent practical application of supertree methods). The wader supertree supports the monophyly of the two major lineages (Scolopacida and Charadriida), and as such follows the main conclusions of established phylogenetic hypotheses (e.g. Strauch 1978, Sibley & Ahlquist 1990, Chu 1995). It also has the distinct advantage of covering the entire taxonomic range of the waders.

Phylogenetic analyses

Comparative analyses of publication bias were carried out using Felsenstein's (1985) method through the evaluation of phylogenetically independent contrasts for all variables as implemented by CAIC (Purvis & Rambaut 1995). This method incorporates phylogenetic history into statistical analyses to prevent the inflation of the degrees of freedom that arises from the use of non-independent samples (Harvey & Pagel 1991).

We considered conservation status and mating system as continuous variables because they both represent a gradation from one extreme to another. Conservation status can be thought of as a continuum from not threatened (1) to extinct (9). Similarly, the three categories of social mating system (polygyny, 1; monogamy, 2; polyandry, 3) can be regarded as a continuum of intensity of sexual selection on males from most (social polygyny) to least (social polyandry).

All variables were logarithmically transformed prior to calculation of independent contrasts ($\log_{10}$x+1). We used the

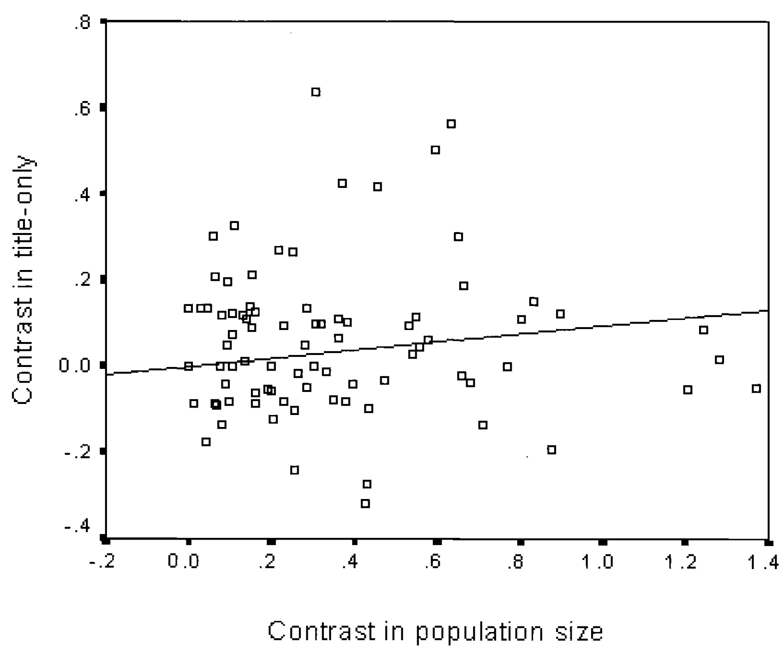

Fig. 1. Regression through the origin between population size contrast and title-only contrast. All data were $\log_{10}$(x+1) transformed prior to calculation of contrasts.

Table 2. Multivariate regressions with title-only as the dependent variable (definitions as for Table 1).

Model	Title-only r^2	F	P	Significant predictors in model
1 (pop, con, mas, win, mig, lat, mat)	0.401	2.864	0.021	pop
2 (pop, con, mas, win, mig, lat)	0.400	3.445	0.010	pop
3 (pop, con, mas, win, lat)	0.393	4.136	0.005	pop
4 (pop, con, mas, win)	0.391	5.287	0.002	pop
5 (pop, con, mas)	0.348	6.058	0.002	pop
6 (pop, con)	0.337	8.915	0.001	pop
7 (pop)	0.277	3.921	0.001	pop

Crunch option of CAIC, allowing comparisons of all nodes in the tree. Branch lengths were not known for many nodes, thus they were set to unity.

Univariate regressions of citations were performed using population size, conservation status, body mass, wing length, absolute breeding latitude, migration distance, and mating system, respectively as the independent variable. Multivariate regressions including all of the above independent variables in the initial model were performed. Following this, we used the backward regression approach whereby the variable with the weakest correlation was removed from the model systematically until all variables remaining in the final model have a significant correlation with the dependent variable. In addition, we carried out multivariate regressions using the two dummy variables described above for mating system. All regressions (uni- and multivariate) were carried out twice, using either the number of citations in title-only, or the number of citations based in text, as the dependent variable. Univariate and multivariate regressions between phylogenetic contrasts were forced through zero (Harvey & Pagel 1991, Garland *et al.* 1992). We report the correlation coefficient, r^2 or r, and $F_{\text{df regression, df error}}$. Finally, the binomial test was used to investigate any trend in the levels of citation between taxa breeding north (scored as 1) or south (scored as 0) of the equator.

RESULTS

Univariate analyses

Citations in title-only significantly correlated with population size (Table 1, Fig. 1; $r^2 = 0.060$, $F_{1, 81} = 5.135$, $P = 0.026$), absolute breeding latitude (Table 1; $r^2 = 0.079$, $F_{1, 108} = 9.266$, $P = 0.003$), and migration distance (Table 1; $r^2 = 0.136$, $F_{1, 110} = 17.296$, $P = 0.000$). These results suggest that those taxa that have larger population sizes, live further from the equator, and migrate furthest, are more likely to be studied than those that have small populations, live on or around the equator, and do not migrate. In addition, there were no further significant correlations with the remaining independent variables (Table 1).

The results in citation in text and population size (Table 1, Fig. 2(a); $r^2 = 0.120$, $F_{1, 81} = 10.999$, $P = 0.001$), absolute breeding latitude (Table 1; $r^2 = 0.078$, $F_{1, 108} = 9.074$, $P = 0.003$), and migration distance (Table 1; $r^2 = 0.138$, $F_{1, 110} = 17.575$, $P = 0.000$) were consistent with the title-only data. In addition, significant correlations were also found between citations in text and conservation status (Table 1; $r^2 = 0.038$, $F_{1, 223} = 8.897$, $P = 0.003$), and body mass (Table 1, Fig. 2(b); $r^2 = 0.031$, $F_{1, 150} = 4.766$, $P = 0.031$). Conservation status had a negative correlation ($B = -0.635$) and is also highly consistent with population size in indicating that the most common taxa (conservation status of 1) are more likely to be studied than are rare taxa. The trend in body mass is towards an increase in citation with increasing mass. Given this relationship, it is perhaps surprising that no such relationship was found with wing length. Mating system showed no significant correlation with text (Table 1).

Mating system

Differences in mating system (male driven or female driven) were not correlated with citations in title-only or in text in a multivariate model using the two dummy variables as independent variables (title-only, $r^2 = 0.024$, $F_{2, 145} = 1.807$, $P = 0.168$; text, $r^2 = 0.027$, $F_{2, 145} = 2.001$, $P = 0.139$). This supports the univariate analysis in suggesting that mating system has not been a major factor in determining the choice of study taxon in waders (Table 1).

Breeding latitude

Regression analysis of absolute breeding latitude revealed a strong correlation with both title-only and text, indicating that waders breeding away from the equator are more often studied. We carried out a binomial test to determine whether this was driven by any trend favouring taxa north or south of the equator (66 positive contrasts, 42 negative contrasts, $n = 108$ contrasts, $p = 0.027$). Taken together, the results of the regression analysis and of the binomial test, suggest that waders breeding north of the equator are more often studied than those that breed south of the equator.

Multivariate analysis

The initial multivariate model included population size, conservation status, body mass, wing length, absolute breeding latitude, mating system, and migratory distance regressed first against title-only (Table 2), and then against text (Table 3). These models both explained a significant amount of variation in contrasts of title-only ($r^2 = 0.401$, $F_{7, 30} = 2.864$, $P = 0.021$) and of text ($r^2 = 0.478$, $F_{7, 30} = 3.921$, $P = 0.004$). To determine the minimum possible number of significant predictor variables, we took a backward regression approach (see Methods). Only population size remained in the final model with title as the independent variable (Table 2; $r^2 = 0.277$, $F_{1, 36} = 3.921$, $P = 0.001$; see also Fig. 1). The final model with text as the independent variable contained

Table 3. Multivariate regressions with text as the dependent variable (definitions as for Table 1).

Model	Text			Significant predictors in model
	r^2	F	P	
1 (pop, con, mas, win, mig, lat, mat)	0.478	3.921	0.004	pop, mas
2 (pop, con, mas, win, mig, lat)	0.478	4.726	0.002	pop, mas, win
3 (pop, con, mas, win, mig)	0.476	5.822	0.001	pop, mas, win
4 (pop, mas, win, mig)	0.467	7.238	0.000	pop, mas, win
5 (pop, mas, win)	0.460	9.648	0.000	pop, mas, win

population size, body mass, and wing length (Table 3; r^2 = 0.460, $F_{3, 34}$ = 9.648, P = 0.000; see Fig. 2 for univariate regressions). Taken together, the results presented herein suggest that population size is the major variable in predicting citations in studies of waders.

DISCUSSION

The emergence of population size as a key variable in predicting citation level in waders is largely expected. Where a species is numerous, field studies are likely to be more efficient in terms of data collection and the results more robust due to increased sample size purely because increased numbers should make observation easier. Hence, whilst species that are globally threatened may be of more intrinsic interest from a conservation perspective, they appear to be less likely to be well studied than non-threatened taxa.

The problem of bias in the fossil record (Koch 1978, Sheehan 1977) may not be directly related to typical studies of waders, however the underlying causes are arguably similar. Abundance of suitable rock outcrops, and geographic factors are cited as major factors that drive systematic bias (Raup 1976). The abundance of fossiliferous rocks is directly analogous to population size because both can be linked to ease of study. The well-documented trend towards palaeontological studies at North American and Western European sites (Smith 2000) may be regarded as funding or politically driven. Whilst our results intimate that waders breeding in the northern hemisphere are more frequently studied than their southern hemisphere counterparts, we need additional geographic data to support or refute this claim.

We should not be surprised by correlative trends with citation of several other variables if their relationship with population size is accounted for. Gaston & Blackburn (1996) discuss the interrelationships of abundance, geographic range, and body size. Specifically, they highlight the notion that large species are typically less abundant than small-bodied ones. With this in mind we would predict that small taxa are likely to be studied (and therefore cited) more often than are large taxa. However, in waders we have demonstrated that that the reverse may be true. We cautiously suggest that this may be for reasons of practically as larger species are easier to observe. This implies that to determine the easiest taxon to study, there is a trade off between population size and body size. The results of the multiple regression against citations in title-only had only population size in the final model (Table 2) indicating that population size is a more useful predictor, although both body mass and wing length were present alongside population size in the final model with text as the dependent variable (Table 3). However, ease of observation may not be a function of population or body size alone, and many other factors such as habitat and behaviour may yet alter these conclusions.

It is apparent that population size alone cannot explain all of the variation in citation rate of wader studies. The possible relationships between predictor variables are multifarious and disentangling these from each other confounds interpretation of their individual and collective impact on wader citation. For example, migratory species are generally confined to temperate zones (Bennett & Owens 2002), where we also expect larger taxa. However, it is clear that when all variables are controlled for, population size is the only variable that consistently correlates with citation (both title and text), and on this basis we cautiously suggest that it is the predominant factor in guiding the choice of study taxon amongst wader workers.

Aside from recognising those factors that influence our choice of study system, it is also important to consider how this affects our understanding of wader biology. In direct response to this, two key questions arise. First, how does bias impact upon our interpretation of data from wader research? And second, what are the major gaps in our knowledge of waders? We can further disseminate these questions by thinking of waders first in the context of the group as whole and in particular of those studies that are concerned primarily with evolutionary questions (frequently using literature based comparative or phylogenetic comparative methods), and second, those studies focusing on particular aspects of behaviour, ecology, or conservation in individual taxa that may involve direct observations or manipulations (field or laboratory methods).

Publication bias has only recently become a major concern in ecology and evolution (see Møller & Jennions 2001 for a review) but the implications for analyses of biased data are more firmly established. Much of the literature is based around the effects on meta-analyses whereby a body of literature on a given topic is summarized by transforming test statistics into a standardized metric called effect size. A central tenet of this approach is that the literature under review is unbiased. Song *et al.* (2000) discuss several types of publication bias that can be summarized as submission, review, and editorial bias. Palmer (2000) presents funnel graphs to detect unpublished studies. Unpublished data (submission bias in Song *et al.* 2000) are often those that yielded non-significant results. All of these occur after the original data collection (be it a field study, laboratory, or literature review based approach). However, the types of bias of concern in our study are primarily those that drive our original choice of study system. Nonetheless, it is self-evident that both *a priori* and *a posteriori* biases will result in a literature set that

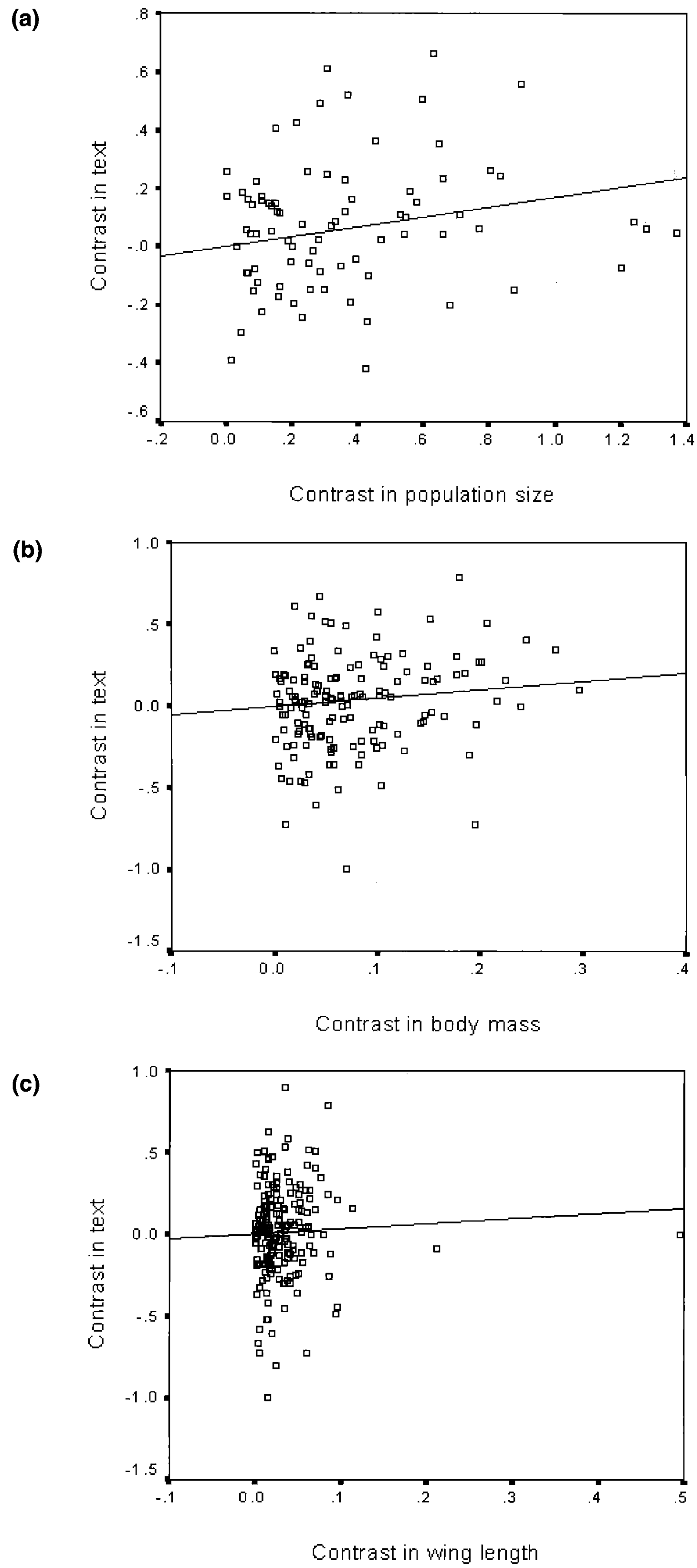

Fig. 2. Regression through the origin between text contrasts and (a) population size contrasts, (b) body mass contrasts, (c) wing length contrasts. All data were $\log_{10}$ (x+1) transformed prior to calculation of contrasts.

cannot be relied upon as a representative picture of genuine biological trends. For example, if we accept that body size and population size correlate (Gaston & Blackburn 1996) then, based on the findings of the present study, any wader study that looks for trends associated with body size is likely to be biased due to over-representation of smaller taxa (i.e. those which we expect to have larger population sizes). Furthermore, a disturbing conservation issue is revealed. The trend towards studies of taxa with large population sizes suggests that scarce taxa are being overlooked, and species such as the Eskimo curlew (*Numenius borealis*), rated 7 (critical) by BirdLife International (Stattersfield & Capper 2000), have not appeared in the literature according to WoS (since 1980). So not only are the results of any study that seeks to use the literature potentially affected to some degree by publication bias, but conservation efforts may also be impaired by *a priori* selection of study organisms.

CONCLUSIONS

Our results presented herein suggest that the choice of study taxa amongst wader enthusiasts is governed predominantly by population size, and that northern hemisphere species are better studied than their southern relatives. These are significant because they mean that typically we are severely lacking in important data on the more endangered species and that evolutionary interpretations may be prone to publication bias. Of course, publications are unlikely to represent the full spectrum of research carried out. Many results will go unpublished, and this is perhaps the crux of the problem. All scientists need to publish, and there are numerous ways of increasing publication success. Choosing a taxon or system from which large sample sizes and robust results can be acquired is surely one of them, but there are others. As a cautionary tale, we conclude with quotes from two leading biologists. John Krebs in a talk at Oxford recalled his advice to prospective PhD students (H.P. Sitters, pers. comm.): "Always work on a well-known system. Do that and the world will beat a pathway to your door. Work on something obscure and your thesis will gather dust." An alternative view is provided by Edward Wilson (Seeley 2001): "When choosing a thesis topic, carefully assess where the biggest scientific battles are being waged, where the intellectual action is the hottest, then move as fast as you can in the opposite direction."

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Appendix 1 – list of wader citations

Species	Number of citations in title-only	Number of citations in text
Syrrhaptes tibetanus	0	0
Syrrhaptes paradoxus	1	1
Pterocles alchata	2	3
Pterocles namaqua	5	13
Pterocles exustus	0	1
Pterocles senegallus	0	0
Pterocles gutturalis	1	1
Pterocles orientalis	2	4
Pterocles coronatus	0	0
Pterocles personatus	1	1
Pterocles decoratus	0	1
Pterocles bicinctus	1	3
Pterocles quadricinctus	0	0
Pterocles indicus	0	0
Pterocles lichtensteinii	0	0
Pterocles burchelli	0	2
Attagis gayi	0	0
Attagis malouinus	0	0
Thinocorus orbignyianus	0	0
Thinocorus rumicivorus	1	3
Pedionomus torquatus	3	5
Scolopax rusticola	11	13
Scolopax mira	0	0
Scolopax saturata	0	0
Scolopax celebensis	0	0
Scolopax rochussenii	0	0
Scolopax minor	3	21
Gallinago solitaria	0	0
Gallinago hardwickii	2	3
Gallinago nemoricola	0	0
Gallinago stenura	1	1
Gallinago megala	0	0
Gallinago media	11	48
Gallinago gallinago	6	28
Gallinago nigripennis	1	1
Gallinago macrodactyla	0	0
Gallinago paraguaiae	0	0
Gallinago andina	0	0
Gallinago nobilis	0	0
Gallinago undulata	0	0
Gallinago jamesoni	0	0
Gallinago stricklandii	0	0
Gallinago imperialis	0	0
Lymnocryptes minimus	0	0
Coenocorypha pusilla	2	2
Coenocorypha aucklandica	2	3
Limosa limosa	8	29
Limosa haemastica	1	6
Limosa lapponica	9	34
Limosa fedoa	0	15
Numenius minutus	1	1
Numenius borealis	0	0
Numenius phaeopus	16	46
Numenius tahitiensis	3	10
Numenius tenuirostris	2	3
Numenius arquata	20	43
Numenius americanus	6	19
Numenius madagascariensis	2	4
Bartramia longicauda	4	11
Tringa erythropus	0	3
Tringa totanus	29	88
Tringa stagnatilis	0	2
Tringa nebularia	3	9
Tringa guttifer	0	0
Tringa melanoleuca	3	4
Tringa flavipes	2	8
Tringa solitaria	1	1
Tringa ochropus	2	3
Tringa glareola	2	4
Tringa cinerea	0	0
Tringa hypoleucos	1	4
Tringa macularia	0	0
Tringa brevipes	0	0
Tringa incana	0	1
Catoptrophorus semipalmatus	9	33
Prosobonia cancellata	0	1
Prosobonia leucoptera	0	0
Arenaria interpres	13	59
Arenaria melanocephala	2	6
Limnodromus griseus	3	13
Limnodromus scolopaceus	0	10
Limnodromus semipalmatus	0	0
Aphriza virgata	0	4
Calidris tenuirostris	1	7
Calidris canutus	36	132
Calidris alba	15	40
Calidris pusilla	13	52
Calidris mauri	12	53
Calidris minuta	3	8
Calidris ruficollis	1	8
Calidris temminckii	3	5
Calidris subminuta	0	0
Calidris minutilla	5	20
Calidris fuscicollis	6	16
Calidris bairdii	1	1
Calidris melanotos	3	11
Calidris acuminata	0	2
Calidris maritima	16	24
Calidris ptilocnemis	1	2
Calidris alpina	58	137
Calidris ferruginea	5	18
Micropalama himantopus	2	2
Tryngites subruficollis	6	11
Eurynorhynchus pygmeus	2	2
Limicola falcinellus	2	5
Philomachus pugnax	22	57
Steganopus tricolor	1	1
Phalaropus lobatus	8	22
Phalaropus fulicaria	0	6
Rostratula benghalensis	1	2
Rostratula semicollaris	0	0
Actophilornis africanus	2	2
Actophilornis albinucha	0	0
Microparra capensis	0	0
Irediparra gallinacea	2	2
Hydrophasianus chirurgus	0	0
Metopidius indicus	2	4
Jacana spinosa	3	7
Jacana jacana	5	11
Chionis alba	1	4
Chionis minor	8	10
Pluvianellus socialis	0	0
Burhinus oedicnemus	13	17
Burhinus senegalensis	0	0
Burhinus vermiculatus	0	0
Burhinus capensis	1	2

Appendix 1 cont. – list of wader citations

Species	Number of citations in title-only	Number of citations in text
Burhinus bistriatus	1	1
Burhinus superciliaris	1	1
Burhinus grallarius	0	0
Burhinus recurvirostris	0	0
Burhinus giganteus	0	0
Haematopus ostralegus	112	292
Haematopus meadewaldoi	1	1
Haematopus moquini	7	14
Haematopus finschi	0	0
Haematopus bachmani	3	21
Haematopus palliatus	5	19
Haematopus longirostris	1	2
Haematopus unicolor	1	2
Haematopus fuliginosus	0	1
Haematopus ater	1	1
Haematopus leucopodus	0	0
Ibidorhyncha struthersii	2	2
Himantopus himantopus	3	7
Himantopus leucocephalus	0	1
Himantopus novaezelandiae	4	7
Himantopus mexicanus	4	22
Himantopus melanurus	2	4
Cladorhynchus leucocephalus	0	2
Recurvirostra avosetta	15	28
Recurvirostra americana	7	40
Recurvirostra novaehollandiae	0	0
Recurvirostra andina	0	0
Pluvialis apricaria	16	33
Pluvialis fulva	3	14
Pluvialis dominica	5	14
Pluvialis squatarola	18	73
Charadrius obscurus	1	3
Charadrius hiaticula	5	22
Charadrius semipalmatus	1	22
Charadrius placidus	0	0
Charadrius dubius	3	8
Charadrius wilsonia	1	9
Charadrius vociferus	6	37
Charadrius thoracicus	0	0
Charadrius sanctaehelenae	0	0
Charadrius pecuarius	0	1
Charadrius tricollaris	0	0
Charadrius forbesi	0	0
Charadrius melodus	11	53
Charadrius pallidus	0	0
Charadrius alexandrinus	10	52
Charadrius marginatus	6	10
Charadrius ruficapillus	1	4
Charadrius peronii	0	0
Charadrius javanicus	0	0
Charadrius collaris	1	1
Charadrius bicinctus	2	6
Charadrius alticola	0	0
Charadrius falklandicus	1	3
Charadrius mongolus	1	4
Charadrius leschenaultii	0	3
Charadrius asiaticus	0	0
Charadrius veredus	0	1
Charadrius montanus	6	12
Charadrius modestus	0	0
Charadrius rubricollis	1	1
Thinornis novaeseelandiae	0	0
Erythrogonys cinctus	0	1
Eudromias morinellus	0	0
Oreopholus ruficollis	0	0
Anarhynchus frontalis	0	1
Phegornis mitchellii	0	0
Peltohyas australis	0	1
Elseyornis melanops	0	0
Vanellus vanellus	51	125
Vanellus crassirostris	0	0
Vanellus malabaricus	0	0
Vanellus macropterus	0	0
Vanellus tricolor	0	1
Vanellus miles	1	3
Vanellus armatus	1	2
Vanellus spinosus	3	6
Vanellus duvaucelii	1	1
Vanellus tectus	0	0
Vanellus melanocephalus	0	0
Vanellus cinereus	0	0
Vanellus indicus	0	0
Vanellus albiceps	0	0
Vanellus senegallus	0	0
Vanellus lugubris	0	0
Vanellus melanopterus	0	1
Vanellus coronatus	2	6
Vanellus superciliosus	0	0
Vanellus gregarius	1	1
Vanellus leucurus	0	0
Vanellus cayanus	0	0
Vanellus chilensis	0	3
Vanellus resplendens	0	0
Dromas ardeola	2	3
Pluvianus aegyptius	1	1
Rhinoptilus africanus	0	0
Rhinoptilus chalcopterus	0	0
Rhinoptilus cinctus	0	0
Rhinoptilus bitorquatus	1	1
Cursorius cursor	0	0
Cursorius rufus	0	1
Cursorius temminckii	1	1
Cursorius coromandelicus	0	0
Glareola pratincola	3	6
Glareola maldivarum	0	0
Glareola nordmanni	1	2
Glareola ocularis	0	0
Glareola nuchalis	0	0
Glareola cinerea	0	0
Glareola lactea	0	0
Stiltia isabella	0	0

WETLANDS INTERNATIONAL

The International Wader Study Group acts as the Wader Specialist Group of Wetlands International and the IUCN Species Survival Commission.

THE INTERNATIONAL WADER STUDY GROUP

The International Wader Study Group (WSG) is an international association of amateurs and professionals from all parts of the world interested in Charadrii (waders or shorebirds). Membership of the WSG is currently over 650 worldwide. Members can be found in over 50 countries around the world, including all the European countries, as well as the Americas, Asia, Africa and Australasia. The interests of the group have diversified from its original focus on ringing and migration-related studies to embrace all aspects of wader biology.

The aims of the International Wader Study Group are:

- ❑ to maintain contact between both amateurs and professionals studying waders
- ❑ to help organise co-operative studies; and
- ❑ to provide a vehicle for the exchange of information on waders and their biology.

The main means of achieving these aims are by:

- ❑ holding an annual conference;
- ❑ publishing, three times per year, the *Wader Study Group Bulletin,* and on an occasional basis, *International Wader Studies*, each issue of which covers a major topic of wader biology and/or conservation; and
- ❑ acting as Wetlands International's Specialist Group on waders.

WADER STUDY GROUP BULLETIN

The *Wader Study Group Bulletin* provides a forum for news, notices, ringing recoveries, recent publications, new study methods and general articles. It also publishes the results of wader research from all parts of the world including preliminary or interim results where appropriate. Each *Bulletin* contains a mix of newsletter items, informal descriptions of research activities, meetings and expeditions, as well as formal presentation of research results and preliminary analyses. The size of the *Bulletin* varies with each issue but usually consists of 60–100 pages.

The *Bulletin* appears in April, August and December. The deadlines for inclusion of announcements are 1 January, 1 May and 1 September respectively. Papers and articles, however, must be received well in advance of these dates to allow time for refereeing.

Papers and articles should be sent to the **Editor, Humphrey Sitters**, Limosa, Old Ebford Lane, Ebford, Exeter EX3 0QR, UK (e-mail: hsitters@aol.com)

News items, announcements and requests for information should be sent to the **Editor of the *Notes & News* section, Robin Ward**, The Wildfowl & Wetlands Trust, Slimbridge, Glos. GL2 7BT, UK (e-mail: robin.ward@wwt.org.uk).

Books and other items for review should be sent to the **Review Editor, David Stroud**, Spring Meadows, Taylors Green, Warmington, Peterborough PE1 1JY, UK (e-mail: David.Stroud@jncc.gov.uk).

Intending contributors from the following regions who need advice or assistance (e.g. as to the scope of a paper or obtaining statistical advice or arranging translation into English) are welcome to contact the following Regional Bulletin Co-ordinators whose contact details can be found on the inside of the front cover:

- ❑ **Russia:** Pavel Tomkovich
- ❑ **North America:** Robert Gill
- ❑ **South America:** Patricia González
- ❑ **Africa:** Les Underhill

Matters relating to the circulation of the *Bulletin* should be sent to the **Membership Secretary, Rodney West**, Flint Cottage, Stone Common, Blaxhall, Woodbridge, Suffolk IP12 2DP, UK (e-mail: rodwest@ndirect.co.uk).

The Editors are always pleased to discuss possible contributions with potential authors, and to advise on presentation. Manuscripts can be typed but should preferably be word-processed and submitted either as e-mail attachments, on 3½" disks or on a CD. If any non-English font (e.g. Polish) is required, a Truetype (.ttf) file for the font must be supplied.

Authors should follow the style of the most recent *Bulletin.* Pay particular attention to the style of headings and reference lists. Line illustrations and figures should be produced neatly in black ink on good-quality white or tracing paper, with linear dimensions about 50% larger than intended publication size. Their final size should relate either to one column width of 85 mm or a double column width of 175 mm or to some measurement within that range of widths. Please send original illustrations and retain a copy in case of loss or damage. Good-quality photographs may also be published. Photographs should be high-contrast glossy prints (preferably black and white or else in colour) and should be submitted at twice their intended published size. Colour slides can also be accepted. It must be understood that such illustrations will be printed as monochrome unless prior arrangements for colour have been made.

The publication of interim results in the *Wader Study Group Bulletin* is not intended to pre-empt publication of final results as journal papers. Readers are requested to bear in mind that results and analyses published in the *Bulletin* may be of a preliminary nature, and to take account of this if making reference to these articles in publications of their own. If editors of other journals wish to reprint items from the *Bulletin* with suitable acknowledgement, this can usually be arranged; the person concerned should contact the Editor.

To celebrate its 25th anniversary, WSG re-launched the occasionally published Special Issues of the *Bulletin* as a new journal series: *International Wader Studies.* Recently published volumes include: Shorebird Research in the Western Hemisphere; Conservation and management of shorebirds in the Western Great Basin of North America; and Wader Research and Conservation in Europe and North Asia (the Proceedings of the Odessa Conference); whilst forthcoming issues include: Wader study methods (two volumes), and a review of the status of European Avocets *Recurvirostra avosetta.*

Membership of the International Wader Study Group is open to all those with an interest in waders (shorebirds).

Membership costs £17 (or €27 or US$27) a year in high-income countries and half this amount in low-income countries. The subscription can be paid in most international currencies; contact the Membership Secretary for details.

Members receive the *Wader Study Group Bulletin* three times a year; and, without additional cost, copies of the occasional series *International Wader Studies.*

To join the International Wader Study Group contact: the Membership Secretary, Wader Study Group, c/o National Centre for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK.

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