

## Annual Conference – Abstracts of talks

### **An objective method of quantifying the avian interest of an area by means of a weighted population index**

G.E. Austin, A.J. Musgrove, M.J.S. Armitage & M.M. Rehfisch

*British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK, e-mail: graham.austin@bto.org*

When considering the overall importance of an area for waterbirds, it is appropriate to combine in some way the whole assemblage of species present. This is usually done either by summing the number of species or the number of individuals of all species. Although such methods are well established, in most cases birds are summed in such a manner that individuals of different species have equal value. However, the presence of small numbers of a scarce species may be as notable in conservation terms as large numbers of a common species. For example, the wader assemblage of many UK estuaries, based solely on summing the individuals of all species, would be dominated, numerically, by Dunlin *Calidris alpina*.

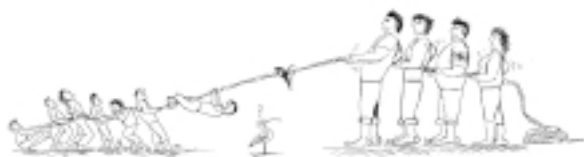
It follows that it may be beneficial to use a method of summing the number of birds at a site that weights the numbers of each species according to its population size, giving more weight to individuals from small populations. We have therefore developed the concept of the Threshold Importance Unit (TIU). In order to demonstrate how TIUs might be used, we draw on work undertaken as part of the UK's Wetland Bird Survey where this concept has already been applied to describe the numbers and distributions of waterbirds, both within well-defined sites and along open coastlines.

### **The Wetland Bird Survey Alerts System – an objective method of identifying important changes in numbers of wintering waterbirds in the United Kingdom at national and local scales**

Graham Austin

*Wetland and Coastal Ecology Unit, British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, e-mail: graham.austin@bto.org*

This paper introduces the Wetland Bird Survey's Alerts system. The Alerts System provides a standardised technique with which to monitor changes in the population sizes of



*The English team won the competition, because nobody was prepared to compete with professionals.*

wintering waterbirds in the UK, over a range of spatial scales and time periods using data collected as part of the Wetland Bird Survey.

### **The impact of the Cardiff Bay Barrage on wintering waterbirds**

Niall Burton

*British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK, e-mail: niall.burton@bto.org*

Cardiff Bay, a 2 km<sup>2</sup> area of mudflats and saltmarsh at the mouth of the Severn Estuary in the UK, was enclosed by a barrage on 4 November 1999. This created a recreational lake that now forms the centre point for the redevelopment of Cardiff's former docklands. The impacts of this habitat loss upon the waterbirds that formerly wintered in the Bay have been the subject of a long-term study by the British Trust for Ornithology. Peaks of 300 Shelduck, 700 Dunlin, 160 Curlew and 340 Redshank occurred in the Bay in the winter of 1998/99, immediately before barrage-closure.

Following the closure of the barrage, the average number of waterbird species using the Bay has fallen from 26.5 to 20.7 per year. The number of wader species recorded each year has halved. The Bay is now primarily used as a roosting site by the four main species studied (Shelduck, Dunlin, Curlew and Redshank) and their numbers have fallen sharply.

Colour-ringing and radio-tracking studies revealed that the majority of Redshanks moved to the Rhymney Estuary, only 4 km away. Many of these birds were forced to use a highly disturbed area that had previously only been used at night. The mass of birds displaced from the Bay was significantly lower than that of other birds using the Rhymney site in the winter following barrage-closure. Survival over this period also decreased. The continuing study aims to determine whether this increased mortality rate is sustained over subsequent winters.

### **Territoriality of African Black Oystercatchers *Haematopus moquini* on Robben Island**

K.M. Calf & L.G. Underhill

*Avian Demography Unit, University of Cape Town, Rondebosch 7701, South Africa  
e-mail: kathy@adu.uct.ac.za*

The African Black Oystercatcher *Haematopus moquini* is the only representative of the family Haematopodidae that breeds in Africa, populating the coast of South Africa and Namibia. In the early 1980s, it was estimated that the African Black Oystercatcher had a world population of about 5,000 birds and it is classified as "near-threatened" both in South Africa and globally. Adult African Black Oystercatchers inhabit the open coast and offshore islands. They are territorial and most stay on the same territory throughout the year. They are long-lived and mate-faithful with a naturally



low reproductive rate ( $\leq 2$  fledglings per pair per year).

This study was conducted on Robben Island, South Africa, from October 2001 to September 2002. The island has a coastline of about 10 km and the shoreline is rocky with various degrees of exposure, dependent on the extent of off-shore reefs. Despite human disturbance to limited areas of the shore, between 1977 and 2001 the number of oystercatchers increased from 40 to c. 190 individuals. As a result, Robben Island is now an important site for the conservation of the species because of the substantial and expanding population. To determine the exact population size and the extent of the expansion of the breeding population, counts of adults, pairs, nests, chicks and fledglings were conducted fortnightly from 5 November 2001 to 4 May 2002 along the entire coastline. During each count, the GPS position of each bird or pair was noted to facilitate the identification of territories and determination of territory size. Pairs were defined as birds that roosted and fed close to each other, but were not necessarily breeding. Nests were searched for regularly and, once found, were monitored at 4–7 day intervals until hatching. Similarly, chicks were monitored until fledging. Although oystercatchers remain with their parents for several months, fledging was taken as the point at which chicks can fly well, which occurs at an age of about five weeks, when the chicks reach two-thirds of adult body mass. Fledglings were counted until they left the breeding territory to head for nursery areas on the Namibian coast.

#### Waders, weight and winter weather

Jacquie Clark

Wash Wader Ringing Group, British Trust for Ornithology and University of East Anglia,  
The Nunnery, Thetford, Norfolk IP24 2PU, UK  
e-mail: jacquie.clark@bto.org

Waders wintering in temperate regions show an annual mass cycle, increasing in mass for migration and also increasing to a mid-winter peak followed by a decline. This winter cycle is thought to arise through a trade-off between carrying fat as 'insurance' against periods when food might be hard to obtain and maintaining a low mass and therefore good manoeuvrability to reduce the risk of predation. This study looks at the mass cycle of waders wintering on the Wash, E England, and investigates the effectiveness of this insurance against severe winter weather and how it varies between species.

As waders are usually caught in large numbers over a short period of time, birds have to be held in temporary captivity. During this time they lose mass through food-processing and water loss. The time between capture and weighing varies, so mass loss was measured and a model to correct for both time in captivity and time since high tide (a proxy for time of last feeding) was produced and used to correct all measurements of mass.

The mass cycles of a number of wader species in non-severe winters were used to model the effects of day-length and temperature on mass. Different patterns were found. For example, Grey Plover and Redshank, species that are susceptible to severe weather, appeared to be unable to maintain the same mass at low temperatures when day-length was short as they could during longer days, suggesting that day-length may be critical. By contrast, Dunlin and Knot, which are less

susceptible to the effects of severe weather, appear to maintain a higher mass at low temperatures when day-length is short than when it is long, suggesting an ability to react to low temperatures by increasing mass.

The mass of birds caught alive and found dead in severe weather periods was compared to the normal mass of that species at that time of year. The birds found dead were well below the normal mass. Differing patterns were again found. For example, Grey Plover had a lower than expected mass in severe weather but Dunlin had a higher than expected mass. This also suggests that vulnerable species are those that are unable to react to the severe weather by maintaining or increasing their mass. The differences between species probably relate to feeding-method, prey-type and the ability to exploit different prey and feeding areas when conditions change.

This study suggests that feeding time may become a critical factor for some species in severe weather. This may mean that, during severe weather, disturbance may become a significant factor affecting survival. However, with global warming, there are likely to be less severe weather spells in Britain in future so the importance of consequent mortality and poor condition is likely to decline. If this has been a controlling factor in the past, then there might be implications for both wader distribution and population levels.

#### Four decades of study of the Rock Sandpiper and still so many questions

R.E. Gill Jr.<sup>1</sup>, P.S. Tomkovich<sup>2</sup> & B.J. McCaffery<sup>3</sup>

<sup>1</sup> U.S. Geological Survey, Alaska Science Center,  
1011 East Tudor Road, Anchorage, AK 99503  
e-mail: robert\_gill@usgs.gov

<sup>2</sup> Ornithology Department, Zoological Museum,  
Moscow State University, Bolshaya Nikitskaya Str. 6,  
103009 Moscow K-9, Russia  
e-mail: pst@zmmu.msu.ru

<sup>3</sup> U.S. Fish and Wildlife Service, Yukon Delta National  
Wildlife Refuge, PO Box 346, Bethel, AK 99559  
e-mail: brian\_mccaffery@fws.gov

The Rock Sandpiper *Calidris ptilocnemis* is the Beringian counterpart of the Atlantic Purple Sandpiper *C. maritima*. Its biology was recently summarised by us in the *Birds of North America* series. A standard feature of these accounts is to address information gaps and research needs. Here we discuss some of the more important gaps in knowledge revealed to us during this exercise.

The foremost need is a clearer understanding of the taxonomy, distribution, movements and mixing of the various subspecific populations, of which four are recognised; a fifth, *C. p. kurilensis*, is probably a valid subspecies but it is the least known of the taxa owing to its small, isolated population. Zones of nesting sympatry or contact between mainland nesting *tschuktschorum* and *couesi* and insular nesting *tschuktschorum* and *ptilocnemis* are suspected, but as yet unknown. Understanding of this might best come from analysis of molecular markers coupled with more powerful assessments of morphological characters.

Another issue is the use of space during all seasons and at different scales. For instance, are *couesi* from the Aleutian Archipelago and *quarta* from the Commander Islands sedentary, or does some proportion of their populations move



east during the non-breeding season – *quarta* into the range of *couesi* and *couesi* within or out of its range? The insular-nesting nominate subspecies of the northern Bering Sea appears to be the only population with a moult migration, but exactly where and when this occurs remains unclear. Generally, use of specific wintering areas among all subspecies is poorly known, especially at sites along the Alaska Peninsula and the northeast Pacific coast.

Breeding densities appear to fluctuate markedly, especially among insular-nesting populations, but no population-level assessments have been made for any subspecies. The large number of birds wintering in Cook Inlet, Alaska, affords opportunities to address several questions related to wintering ecology of shorebirds at northern latitudes, not only in terms of adaptations involving fattening, environmentally-induced starvation, and thermoregulation/hypothermia, but also for such things as the sensory mechanisms used for prey detection in a largely nocturnal and frozen environment. General studies of the geographic variation in vocalizations are needed, as are specific studies of the context and structural variations in the song and other breeding-season calls. Among all populations, the large proportion of second-year birds apparently breeding is puzzling and warrants detailed study of mortality and population demographics. Lastly, the parental care system among Chukotka-nesting *tschuktschorum* differs from most monogamous arctic-nesting waders in that one of the mates (female or less commonly male) can desert the nest or brood at any time. What drives this behaviour?

### Sanderlings in the Wadden Sea

Klaus Günther

WWF Germany, Monitoring of Migratory Birds in the Wadden Sea of Schleswig-Holstein, WWF Germany Project Office Wadden Sea Norderstrasse 3D-25813 Husum, Germany, e-mail: [guenther@wwf.de](mailto:guenther@wwf.de)

A large proportion of the East Atlantic Flyway population of Sanderlings *Calidris alba* migrate through the Wadden Sea. During spring migration, numbers are highest in May in all areas of the Wadden Sea. On autumn migration, numbers peak over a longer period from August to October and vary much more in different parts of the Wadden Sea. A few thousand birds remain over winter especially in the southwest. It is well established that Sanderlings prefer to feed and roost on sandy tidal flats, beaches and sandbars far away from the mainland coast. However, there are some interesting exceptions, especially in Schleswig-Holstein in May where up to 13,000 Sanderlings roost during high tide on the mainland coast at the edge of a saltmarsh. An unusual feeding habitat for up to 2,000 Sanderlings in May is to be found in the brackish zone of the Eider estuary behind the storm barrier, where they feed alongside Bar-tailed Godwit males on *Corophium* spp. on muddy tidal flats. The distribution of Sanderlings can vary considerably from year to year. On the basis of departure observations at the end of May and early June, it is very likely that the Wadden Sea Sanderlings are mainly of Nearctic origin. During the winter and migration periods, only a few colour-ringed individuals have been recorded away from the Wadden Sea. Most were from various places further south, particularly on the Atlantic and Mediterranean coasts, but also by a lake in Switzerland.

### Avocet chicks in different latitudes: comparison of thermoregulation, time budgets and energy expenditure of chicks from northern Germany and southern Spain

Ralf Joest<sup>1</sup>, Hermann Hötter<sup>2</sup>, Gonzalo Munoz Arroyo<sup>3</sup> & G. Henk Visser<sup>4</sup>

<sup>1</sup>Am Bahndamm 10, 59597 Erwitte, Germany  
e-mail: [ralfjoest@yahoo.de](mailto:ralfjoest@yahoo.de)

<sup>2</sup>NABU Institut, Bergenhusen, Germany,

<sup>3</sup>Facultad de Ciencias del Mar, Universidad de Cadiz, Spain,

<sup>4</sup>Centre for Isotope Research, University of Groningen, the Netherlands

Compared to other wader species, the breeding distribution of Avocets *Recurvirostra avosetta* covers a wide latitudinal range, extending from the Wadden Sea coast in NW Europe to continental central Asia, the Mediterranean and southwards to E and S Africa. Within this area, they are exposed to a wide range of climatic conditions. This is a special challenge for their precocial chicks, which, due to their exposed lifestyle, poor insulation, lower metabolic capacity and relatively high surface to volume ratio are particularly vulnerable to unfavourable climatic conditions. In order to understand the ethological and physiological ways in which chicks adapt to climatic conditions at different latitudes, we compared the development of homeothermy, energy expenditure as measured by the doubly labelled water method and time budgets of avocet chicks growing up on the German Wadden Sea coast (the northern border of the species range) and in the Bay of Cadiz in southern Spain.

### Types of territorial interactions in Grey Plovers

J. Kasatkina

107143 Moscow, Otkritoe shosse st., 21-8-143  
e-mail: [kasatka13@yandex.ru](mailto:kasatka13@yandex.ru)

The territorial interactions of Grey Plovers *Pluvialis squatarola* were studied on wintering grounds and at stopover sites during autumn migration on the western coast of the Caspian Sea. Interactions were categorized into three types as follows: (1) "instant exile" – momentary direct physical contacts, (2) "ratio determination" – prolonged ritualised interactions without direct aggression and (3) "intermediate" – other contacts, neither instant exile nor ratio determination, but combining features of both: approaching another bird, some elements of ritualised contacts and, at the opposite extreme, direct aggression.

It was found that the type of interaction was affected by the ecological situation. In stable feeding conditions with a stable social structure, there was a higher incidence of ratio determination as well as some intermediate interactions. Conversely non-stable conditions led to an increase of instant exile and especially intermediate interactions. It is suggested that the type of territorial interaction is probably determined by neighbour familiarity.



### Population trends of waders in Sweden

Åke Lindström

Department of Animal Ecology, Lund University,  
Ecology Building, 223 62 Lund, Sweden, and Ottenby  
Bird Observatory, Pl. 1500, 380 65 Degerhamn,  
Sweden, e-mail: ake.lindstrom@zoekol.lu.se

I review information about population trends of common wader species breeding in Sweden, or passing through Sweden on migration (arctic breeders). The analysis is based on two main data sources: (1) The Swedish Common Breeding Bird Census (since 1975) and (2) regular trapping and observations at Ottenby Bird Observatory (since 1946). Data-quality ranges from good to tentative. Data are presented for 10 of the 29 wader species breeding in Sweden, and for nine wader species (mainly arctic breeding) occurring regularly on passage.

For Swedish breeding populations, a decline in numbers over the last 30–50 years has been recorded for Lapwing *Vanellus vanellus*, Common Snipe *Gallinago gallinago*, Redshank *Tringa totanus*, Wood Sandpiper *T. glareola*, and Ruddy Turnstone *Arenaria interpres*. Populations seem stable for Broad-billed Sandpiper *Limicola falcinellus*, Eurasian Curlew *Numenius arquata*, Green Sandpiper *T. ochropus* and Common Sandpiper *Actitis hypoleucos*. Little Ringed Plover *Charadrius dubius* may have become more common.

Among waders passing through Sweden, Ringed Plover *Ch. hiaticula*, Ruff *Philomachus pugnax* and Woodcock *Scolopax rusticola* have declined in numbers, and Temminck's Stint *Calidris temminckii*, Little Stint *Ca. minuta*, Red Knot *Ca. canutus*, Curlew Sandpiper *Ca. ferruginea* and Dunlin *Ca. alpina* populations seem stable.

Population data are not available for a large number of species, particularly those breeding in northern Sweden.

### Estimating the distribution of the start of incubation: the African Black Oystercatcher *Haematopus moquini* as an example

Sandra D. Matanyaire, Kathy M. Calf &  
Les G. Underhill

Avian Demography Unit, University of Cape Town,  
Rondebosch, 7701, South Africa  
e-mail: Lgu@adu.uct.ac.za

This methodological paper shows how careful taking of measurements and masses of eggs during incubation can be used to estimate the distribution of the starting dates of incubation. Biologically, the method is based on the fact that eggs lose mass steadily from the start of incubation. Linear regression is used to “backcast” the dates at which eggs had their estimated laying mass. The kernel method is used to estimate the probability distribution of incubation starting dates. Various parameters of interest, such as the median starting date and other percentiles, are estimated. Using the bootstrap, confidence intervals for these parameters are found. Randomisation methods can be used to do statistical tests. For example, the null hypothesis that the median starting date is the same at two sites (or in two years) can be tested. The paper will be based on data collected for the African Black Oystercatcher on Robben Island in the 2001–2002 breeding season. The presentation will be practical, rather than theoretical.

### Current numbers of Great Snipe *Gallinago media* in Belarus: probable trends and causes of population decline

Edward Mongin

Institute of Zoology, Akademicheskaya str., 27,  
220072 Minsk, Belarus  
e-mail: mongin@biobel.bas-net.by

Data on numbers, distribution and habitat selection of Great Snipe in Belarus were collected in the framework of the OMPO (Migratory Birds of the Western Palearctic) International Program “Snipes”. It was the first special study of this species and was undertaken during 2000–2001.

Intensive research was carried out in the majority of administrative districts in Belarus. Fifty-five Great Snipe leks were located during the survey, including 10 previously known. In addition, birds were found at 10 foraging sites used during the breeding season. The current breeding population of the Great Snipe in Belarus is estimated at 4,600–6,000 males. This is based on the number of lekking males at known leks and estimates of the numbers using leks in floodplain meadows that were not surveyed.

Most leks (71%) were found in floodplain meadows suggesting that they are the preferred breeding habitat and 18.2% were found in fen mires. Only a few were located in areas that had been drained (5.5%). In all such cases, however, previously drained lands were either undergoing a process of secondary swamping or were temporarily flooded. Also a few leks were found in transitional (mesotrophic) mires (5.5%).

The data on population trends of Great Snipe in Belarus are extremely limited, but undoubtedly a considerable decline has occurred over the last 40 years. Datskevich (1998) recorded a decline of the breeding population in Belovezhskaya pushcha between the mid 1950s and the 1990s. During the 1980s, breeding birds disappeared from the Lesnaya River floodplain meadows and the Dikiy Nikor fen mire (in the vicinity of Belovezhskaya pushcha). The author related this to drainage activities carried out in the region. Great Snipe leks were not found at these localities in 2000–2001. Duchits (1972) wrote that Great Snipes stop breeding in fen mires during the first stage of drainage activities.

Probably hunting has had significant negative impact on the Great Snipe population as a whole, as it has in Belarus. Vladyshevsky (1966) noted that intensive hunting in August was extremely harmful not only for migratory birds, but also for local breeders, which usually remain in their breeding sites until the last ten days of August.

Undoubtedly, loss of the main habitats – fen mires and floodplain meadows – is the principal reason for the decline in the Great Snipe population of Belarus. According to Golod (1994), the area of floodplain meadows and fens has been reduced by at least 50% during the past 40 years. Therefore it is reasonable to suppose that during this period the breeding population of Belarus has halved because of habitat loss alone.

No alternative habitats suitable for Great Snipes have been created in Belarus as a result of human activities. Only leks used by single birds were found in polders, but these sites were subject to secondary swamping or located near natural floodplain meadows.



## “Waterbirds at Low Tide” – the UK WeBS Low Tide Count Atlas

Andy Musgrove

*WeBS National Organiser (Low Tide Counts), British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, e-mail: andy.musgrove@bto.org*

An “atlas” is currently being prepared summarising the first seven winters of the Wetland Bird Survey Low Tide Count scheme (1992–93 to 1998–99). The outline of the book will be described along with examples of the results obtained. The issues that need to be taken into consideration when interpreting low tide counts will also be discussed.

## Trends in mass and numbers of Red Knots, Ruddy Turnstones and Sanderlings on the Delaware Bay, USA

Larry Niles<sup>1</sup>, Kathy Clark<sup>1</sup>, Clive Minton, Nigel Clark,  
Allan Baker & Humphrey Sitters

<sup>1</sup>*NJ Endangered and Nongame Species Program,  
501 E. State St., PO 400, Trenton, NJ, 08625-0400,  
USA, e-mail: Larry.Niles@dep.state.nj.us*

In May each year, six species of Arctic-nesting shorebirds stopover in Delaware Bay, USA, to build mass by feeding on the eggs of the horseshoe crab *Limulus polyphemus*. These abundant, nutrient-rich, pin-head-size eggs allow the birds to build sufficient mass to complete a non-stop flight to Arctic breeding grounds.

During 1997–2002, we conducted weekly bay-wide aerial counts and captured 20,092 shorebirds to study trends in mass and numbers of Red Knots, Ruddy Turnstones and Sanderlings. Our data confirmed the importance of Delaware Bay stopover habitats with mass increases of 40% or more in all three species and daily increases of up to 15% per day. Red Knots increased mass by as much as 92% (e.g. in 1998, the mean mass of samples increased from 105.0g to 205.1g), having arrived at masses lower than at any comparable stopover in the world (mean arrival mass/year of 109–122g). At the same time, the stopover is relatively short (around 15 days), made inflexible by an early start of Arctic breeding. Therefore rates of mass gain achieved in Delaware Bay are all the more important.

Following a significant decline in horseshoe crab numbers and available eggs (estimated by some at 90% since 1990), we found that the crude rate of mass increase in Red Knots caught (i.e. not necessarily individuals) declined from 1997 to 2002.

Aerial counts showed that the peak in Red Knot numbers in 1997 and 1998 coincided with the peak in mass, indicating a successful stopover and consequent departure. In 2000 and 2001, however, Red Knots apparently left Delaware Bay at much lower masses. We infer that this was a consequence of insufficient resources of *Limulus* eggs in Delaware Bay. This is supported by observations in 2001 and 2002 that a large proportion of the Red Knot population (at least 25%) fed regularly on alternative foods on the Atlantic coast (blue mussel *Mytilus edulis* spat in 2001, surf clams *Donax variabilis* in 2002).

Ruddy Turnstones, which have the ability to excavate *Limulus* egg masses, and Sanderlings, which use alternative

food resources on the Atlantic coast beaches, increased their stay each year with >50% of their respective populations still in Delaware Bay in the second week of June 2001, two weeks after their departure date of earlier years.

This apparent decline in ability to gain mass, especially in Red Knots, may lead to an increase in mortality during onward migration to the Arctic and/or to a reduction in breeding success. Moreover the shorebirds have become more concentrated into smaller and fewer areas of Delaware Bay where *Limulus* eggs are still available. This makes them more vulnerable to predation, increases competition, and exacerbates the effects of disturbance. Perhaps these are the reasons why the peak number of Red Knots passing through Delaware Bay in May has declined from 50,360 in 1997 to 31,695 in 2002. This decline parallels a similar decrease in numbers counted in the wintering areas of South America over the same period.

## Genetic structure of redshank populations breeding in Scandinavia

Richard Ottvall

*Lund University/Gotland University, Dept. of Animal Ecology, Ecology Building, SE-223 62 Lund, Sweden  
e-mail: richard.ottvall@zoekol.lu.se*

Morphological data suggest that three subspecies of redshanks occur in the Western Palearctic: *Tringa totanus robusta* breeding on Iceland and the Faeroe Islands, *T. t. britannica* breeding in Great Britain, the Netherlands, Germany and S Scandinavia and *T. t. totanus* breeding in N Scandinavia. Preliminary DNA-analysis has revealed little genetic differentiation in mitochondrial DNA among redshanks. In this study, I have used Amplified Fragment Length Polymorphism (AFLP) to study the genetic structure among redshank populations in Scandinavia. I typed 75 birds from five different populations for 23 informative AFLP markers obtained by screening 5 AFLP primer combinations. No significant genetic differentiation was found ( $F_{st} = 0.00$ ) among southern populations. However, a few genetic markers differed substantially in frequency between northern and southern Scandinavia. This genetic difference is consistent with morphological data. It also suggests that the southern populations sampled in the present study belong to a pan-mictic unit.

## Changes in Ruff *Philomachus pugnax* body mass during northward migration in Southern Belarus

Pavel Pinchuk<sup>1</sup> & Natallia Karlionava<sup>2</sup>

<sup>1</sup>*Institute of Zoology, Akademichnaya Str. 27, Minsk 220072, Belarus, e-mail: bym@biobel.bas-net.by*

<sup>2</sup>*Gomel State University, Sovetskaya Str. 106, Gomel 246000, Belarus*

We present data on mass variation in Ruffs *Philomachus pugnax* during the spring migration seasons of 2001 and 2002 in the Pripyat floodplain, Southern Belarus.

In total, 454 adult males, 77 second-year males, 249 adult females and 18 second-year females were ringed, measured and weighed from mid-March to mid-May. For the purposes of analysis, all data were grouped in standard 5-day periods.



The mean body mass of adult males increased from 193 g at the end of March to 239g in the first ten days of May. The increase of body mass was statistically significant (ANOVA,  $F_{2,780} = 21.54$ ;  $p < 0.0001$ ). The maximum mean masses were recorded in the peak of migration around the end of April and beginning of May. Minimum masses of individuals were 164 g (on 2 April), 166 g (1 April) and 168 g (4 May). The highest individual masses were 287 g (29 April), 288 g (5 May), 290 g (8 May) and 299 g (6 May).

Females arrive at the Pripyat floodplain one month later, on average, than males. Mean body mass varied only from 116 g to 119 g. There was no significant change in the body mass of females between the beginning and end of the migration period ( $F_{4,587} = 0.35$ ;  $p = 0.85$ ). Individual masses of adult females varied from 80 g to 156 g.

Second-year males and second-year females had lower mean weights than the respective adult categories (t-test, for males  $p < 0.0001$ ; for females  $p < 0.001$ ). Mean body mass of second-year males varied from 189 g to 196 g. Individual masses of second-year males varied from 159 g to 253 g; second-year females, from 100 g to 126 g. There was no significant change in the body mass of second-year males during spring migration ( $F_{1,714} = 1.01$ ;  $p = 0.41$ ). The number of second-year females trapped was insufficient for an analysis of body mass variation.

The average weights of adult birds (especially males) were higher than those reported from other areas in Europe during spring migration.

Two birds were recaptured at the ringing site in the following year. Five were recaptured later in the same year with maximum periods between first and second captures of 15–17 days.

### Waders in the Caspian Sea region: does competition regulate their interspecific relationships on staging areas?

Andrey Shubin

Moscow State Pedagogical University, Zoology & Ecology Dept., Kibalchicha 6, building 5, Moscow 129278, Russia, e-mail: andrey\_shubin@mtu-net.ru

Interspecific competition was studied among waders at sites on the west coast of the Caspian Sea and at steppe wetlands in SE European Russia. Data on foraging, aggressive behaviour and food abundance were analysed for 14 passage migrants and six wintering species.

In August, most species that fed together in each micro-habitat showed high similarities in their feeding behaviour and peck rates. Probably this was a result of the high abundance and low species-diversity of their prey, mainly Chironomid larvae. In January, feeding behaviour and prey-size differed significantly between species.

On the coast of the Caspian Sea in both August and January, interspecific aggression and territorial behaviour was more common than in the steppe wetlands and there were greater differences between species in foraging habits, especially in sites where prey was less abundant. Probably there is less competition between species in the steppe wetlands because of more abundant food supplies there.

### Lunar periodicity in the weights of six sandpiper species in NW Australia

Humphrey Sitters<sup>1</sup>, Clive Minton, Rosalind Jessop & Peter Collins

<sup>1</sup>Limosa, Old Ebford Lane, Ebford, Exeter EX3 0QR, UK, e-mail: hsitters@aol.com

The immatures of six sandpiper species that overwinter in NW Australia – Red-necked Stint *Calidris ruficollis*, Curlew Sandpiper *C. ferruginea*, Terek Sandpiper *Xenus cinereus*, Grey-tailed Tattler *Heteroscelus brevipes*, Red Knot *C. canutus* and Great Knot *C. tenuirostris* – showed a lunar periodicity in their weights during a study in Aug–Oct 1998. The weights were about 10% higher around full moon than around new moon, after controlling for variation arising from other factors such as body size. NW Australia enjoys completely cloudless skies during Aug–Oct and there is no light pollution. Therefore nocturnal illumination would have depended entirely on the phase of the moon. The study was limited to immatures because they are sedentary throughout the whole of their second calendar year. In contrast, the weights of adults during Aug–Oct would have been affected by factors related to migration.

We discuss the following hypotheses:

1. The weight cycle is endogenous and arises because the risk of predation is higher over new moon than over full moon and/or because the risk of starvation is higher over full moon than over new moon or
2. The weight cycle reflects better feeding conditions over full moon when prey becomes more available and/or it becomes easier to catch, probably because of better visibility.

### Turnstone and wheat: vegetarianism or problems with intertidal prey?

Jennifer Smart<sup>1</sup> & Jennifer Gill<sup>2</sup>

<sup>1</sup> School of Biological Sciences, University of East Anglia, Norwich, NR4 7TJ, UK

e-mail: markandjen@buckenham.fsnet.co.uk

<sup>2</sup> School of Biological Sciences & Tyndall Centre for Climate Change Research, University of East Anglia, Norwich, NR4 7TJ, UK

Many shorebird species forage almost exclusively in intertidal habitats. When they choose to forage in other habitats, it may either be a response to deteriorating intertidal food supplies or to the discovery of more profitable resources elsewhere. Distinguishing between these two processes is important for identifying potential problems with intertidal invertebrate populations.

Since January 1998, Turnstones *Arenaria interpres* on the Wash estuary, SE England, have been foraging on wheat and fishmeal on the dockside at Port Sutton Bridge and on adjacent river edges and arable fields. This raised concern that intertidal food supplies were no longer sufficient to support the wintering Turnstone population. To assess whether this was likely to be the case, the distribution and foraging behav-



our of Turnstones in different habitats within the Wash were quantified in relation to season, tidal state and weather.

Numbers of Turnstones using non-intertidal habitats increased over the winter and use of the port area was significantly greater around high tide and on colder days. Prey remains from all habitats were found in individual faecal samples, indicating that individual Turnstones were not restricting themselves to particular habitats. Radio-tracking individual Turnstones confirmed that both intertidal and non-intertidal habitats were used on a daily basis. A depletion model was used to predict the number of Turnstones that could be supported by the port, under a range of resource densities and environmental conditions. This showed that on 90% of days the port could support much greater numbers of Turnstones than actually occurred there.

The tidal nature of port use and the potential for a much greater proportion of the Turnstone population to use the port than currently does suggests that the port is not a preferred resource. Low food quality and high levels of disturbance and predation risk may be the cause of this. The use of these habitats therefore suggests that the preferred intertidal food supplies are not currently capable of supporting the Wash Turnstone population throughout the winter.

### The role of plumage and bill coloration in the aggressive behaviour of oystercatchers

Larisa Stepanova

*Department of Zoology and Ecology, Moscow Pedagogical University, Street Kibalchicha 6, building 5, Moscow, 129278, Russia  
e-mail: oystercatcher@mail.ru*

Strongly contrasting coloration in oystercatchers is considered to be an adaptation to the seashore habitat. However, its cryptic function appears to be rather ineffective as the species has low reproductive success due to predation by gulls and crows (Bianki 1967, Rudenko 1988). The coloration

might have appeared and evolved during the development of the oystercatcher's social system and territorial behaviour. Thus colour patterns may be used as signals in self-advertising by a territory owner or in conflicts with intruders (combined with behavioural patterns).

The aggressive behaviour of oystercatchers was studied in the White Sea, NW Russia, and in the Black Sea, S Ukraine, during 1999–2002. In order to investigate the role of colour in species identification and in eliciting or restraining aggression, three-dimensional models were placed within the nesting territories of 28 pairs. The models were of the same size as oystercatchers but coloured differently: (1) "normal" – coloured exactly as an oystercatcher, (2) "absent red" – pied body with black bill, (3) "hyper red" – pied body with red head and bill, (4) "absent white" – black body, red bill, (5) "vague" – with indistinct border between black and white.

All models were successful in eliciting aggressive behaviour. The greatest number of attacks and highly aggressive postures and demonstrations were performed towards the "absent red" model. The "normal" model elicited the same responses as performed in conflicts with real intruders. "Hyper red" caused mainly displacement activities, but attacks were recorded occasionally. The most variable responses were recorded towards the "absent white" model. Piping was performed mainly towards the "normal" and "vague" models. The response of breeding pairs in areas with a low density of oystercatchers was different from that in high-density areas. A black and white pattern and a red bill were significant in species identification. However, both "absent white" and "hyper red" models were identified as conspecifics, therefore coloration limits to recognition are rather wide. Absence of red colour elicited aggressive responses, while its presence made opponents keep their distance. The greater the number of neighbouring pairs, the more variable were the responses towards both intruders and the models. The signal role of colour patterns is probably increased in conditions of social stress.

## Annual Conference – Poster Abstracts

During the conference, Petra de Goeij organised the usual poster competition and all participants voted for the one they preferred. The results were:

- ★ **1st prize: Management techniques for breeding waders on lowland wet grassland** by Mark Smart, Jennifer Smart, Catherine Joiner, Nick Wilkinson & Mark Bolton
- ★ **2nd prize: Uniparental care in purple sandpipers – a consequence of male territoriality?** by Jannik Hansen, Elin P. Pierce & Torben Dabelsteen
- ★ **3rd prize: Cockles, oystercatchers and the conflict between nature values and commercial exploitation** by Simon Verhulst, Bruno J. Ens, Kees Oosterbeek & Anne Rutten
- ★ There was also a special prize for the poster displaying the **best artwork**. This was won by Anton P. Ivanov for **Waders on steppe wetlands in European Russia during migration: an analysis of spatial distribution at both regional and local scales**.



*The prize in the poster competition was essentially Polish.*



### Feeding ecology of the Curlew *Numenius arquata* in winter in Western France

Nicolas Boileau, Frédéric Corre, Philippe Delaporte & Grégory Saillard

Nature Reserve of Moëze-Oléron, Plaisance,  
F-17780 Saint-Froult, France  
e-mail: nicolas.boileau@club-internet.fr

The feeding ecology of the Curlew *Numenius arquata* was studied during the 2001/2002 winter in the nature reserve of Moëze-Oléron, Charente-Maritime, Western France (45°54'N, 1°03'W). The study area, managed by the Ligue Pour la Protection des Oiseaux, is a large tidal mudflat of about 6,000 ha and includes 13 km of coast and 214 ha of coastal wetlands consisting of pastures and saltmarshes.

Around 800 Curlews were present from October 2001 to early February 2002. This number is similar to the wintering population recorded throughout the 1990s.

The feeding behaviour of Curlews was studied from October to March on both ebb tide and rising tide in four 250 m square study plots, marked out on the mudflats 400–800 m from the shore at high tide. Data on feeding behaviour were recorded during 2-minute fixed intervals (see method reviewed by Piersma 1987 *Mar. Ecol. Prog. Ser.* 38: 187–196) and birds were counted in each study plot every 30 minutes.

The main results, obtained over a cumulative total of 80 hours of observations, were:

1. The density of Curlews in the study plots decreased during winter from 0.5 to 0.2 birds/ha.
2. The density of Curlews was positively correlated with average air-temperature.
3. The density of Curlews was positively correlated with the density of 1st year *Scrobicularia plana* (but not with the density of adult *Scrobicularia*).
4. Prey consisted mainly of *Scrobicularia plana* (the proportion of which decreased during the winter) and ragworms *Nereis diversicolor* (the proportion of which increased during the winter).

### Declining shorebird populations and agricultural change in NE Poland

Norbert Duda & Włodzimierz Chetnicki

University in BiaBystok, Institute of Biology,  
Department of Vertebrate Zoology,  
ul. Świerkowa 20 B, 15-950 BiaBystok, Poland  
e-mail: nduda@uwb.edu.pl

In recent decades, declines in the numbers of breeding shorebirds in both Europe and North America have received considerable attention from researchers. In many cases these have been attributed to loss or damage to nesting habitat as a result of changes in the management of agricultural land. In this study, we present results from long-term observations of nest densities of Lapwing, Redshank and Black-tailed

Godwit. The number of nesting birds on a river island in the valley of the Narew was monitored from 1982 to 2002. These data were compared with agricultural statistics taken from *Concise Statistical Yearbooks of Poland* published by Polish Official Statistics. We noted statistically significant declines in the number of nests of Lapwings ( $r = -0.852$ ,  $p = 0.000$ ), and Black-tailed Godwits ( $r = -0.6863$ ,  $p = 0.001$ ) in our study site. The number of Redshank nests fluctuated, but did not show a statistically significant change. Nevertheless in the last two breeding seasons, 2001 and 2002, we did not find a nest of any of our three study species. In recent decades, mechanical harvesting has led to an increase in the number of meadows that have been drained. This has allowed farmers to increase production and reduce costs and has led to intensification, and a concentration of farming in profitable areas, coupled with the abandonment of fields that are difficult to access. We consider that changes in agricultural practices have resulted in a loss of habitat for grassland-breeding waders.

### Preliminary results of a study of post-breeding migration of Wood Sandpipers *Tringa glareola* in Northern Italy

Carlo Giannella & Raffaele Gemmato

Museo di Ecologia e Storia Naturale, Piazza Matteotti,  
28-41054 Marano sul Panaro (MO), Italy  
e-mail: carlo.giannella@gambro.com

The Wood Sandpiper is a regular migrant and an irregular winter visitor in Italy. In order to understand migratory routes and timing of passage of birds crossing the Po Plain, a ringing project was undertaken at a restored inland wetland in the Province of Modena. The study covered the post-breeding migration (mid-July to mid-September), when the Wood Sandpiper is one of the commonest waders in Italy. The birds were attracted by tape-lure and stuffed decoys and trapped with pull-nets during the day. Additional night catching was also carried out using mist-nets. A total of 368 birds (107 adults and 261 juveniles) were captured, including four previously ringed in other countries (two in Germany, one each in Poland and Sweden). We retrapped only two birds, both juveniles, one the next day, the other after 13 days. Morphometrics and weight of each bird were taken as well as subcutaneous fat and moult scores. The first sightings of adult migrants in the area were during pentade 39 (10–14 July), some earlier observations were scattered and probably due to over-summering birds. Migration flow increased steadily from pentade 40 (15–19 July) to a peak in pentade 45 (9–13 August), followed by a quick decline until pentade 47 (19–23 August). The first juveniles arrived in pentade 41 (20–24 July), followed by a dramatic increase to 80% or more of total captures after pentade 42 (25–29 July). Juveniles passed through later than adults, with about a 3-pentade time-difference. On average, juveniles (mean = 60.4 g, SD = 7.0, N = 259) were 5% lighter than adults (mean = 63.3g, SD = 8.8, N = 106). The bird retrapped after 13 days had gained 5.4 g, 10% of its previous weight.



### Behaviour guide for amateur census workers? Black-tailed Godwits in Nyord Enge, Denmark

Jannik Hansen<sup>1</sup> & Søren Ferdinand Hansen<sup>2</sup>

<sup>1</sup>Korsgade 11, st.mf., 2200 Copenhagen N, Denmark  
e-mail: jannikh@mailme.dk,

<sup>2</sup>Danish Bird Protection Foundation, Vesterbrogade  
138-140, 1620 Copenhagen V, Denmark

The Danish Bird Protection Foundation (a subdivision of BirdLife Denmark) has a number of bird reserves across Denmark. In several of these, regular breeding bird census work is carried out.

The Nyord Enge reserve holds a breeding population of Black-tailed Godwits *Limosa limosa*, which have recently been a priority species in the management of the reserve.

Census work is heavily reliant on volunteers, which to a certain degree poses problems in terms of accuracy in the counts of breeding pairs.

The aim of our behaviour guide for amateur census workers, is to give the volunteers a quick introduction to the territorial and breeding season behaviour of Black-tailed Godwits in order to improve the volunteers' ability to distinguish breeding birds from non-breeding or surplus birds. A chart of postures, along with a short introduction to flight displays, is an idea currently being considered.

### Uniparental care in purple sandpipers – a consequence of male territoriality?

Jannik Hansen<sup>1</sup>, Elin P. Pierce & Torben Dabelsteen<sup>1</sup>

<sup>1</sup> Dept. of Animal Behaviour, University of  
Copenhagen, 2200 Copenhagen N, Denmark  
e-mail: jannikh@mailme.dk

Female brood desertion is uncommon among birds in general, but widespread among shorebirds. In the Purple Sandpiper *Calidris maritima*, females leave at hatching, and males perform brood care alone. By caring for the brood and holding the territory longer, males may gain greater benefits from brood care than females such as the opportunity to assess potential future mates and preventing late-breeders from nesting nearby. These possible benefits might mean that males have a greater net gain from sole brood care than females.

In Svalbard, we tested whether males were territorial during three periods: pre-incubation, during incubation and while caring for the brood. During pre-incubation, males per-

formed the full range of territorial behaviours, but the number of these declined markedly during incubation, with few behaviours displayed while caring for the brood. Many types of territorial behaviour were only displayed during pre-incubation. The "male territorial benefit theory" is therefore not supported.

### Waders on steppe wetlands in European Russia during migration: an analysis of spatial distribution at both regional and local scales

Anton P. Ivanov

Zoology & Ecology Dept., Moscow State Pedagogical  
University, Kibalchicha 6, building 5, Moscow 129278,  
Russia, e-mail: apivanov@mtu-net.ru

The spatial distribution of migrant waders using steppe wetlands in southern European Russia was studied based on a survey of 40 sites containing potentially suitable habitat. Altogether 36 species were recorded. The analysis was carried out at both regional and local scales. The regional analysis looked at species distribution between the wetlands surveyed. The local analysis looked at distribution between microhabitats within each wetland.

At the regional level, Redshank *Tringa totanus*, Black-winged Stilt *Himantopus himantopus*, Lapwing *Vanellus vanellus* and Ruff *Philomachus pugnax* were the most widespread species, using the largest number of wetlands as stopover sites. In contrast, Avocet *Recurvirostra avosetta*, Curlew *Numenius arquata*, Dunlin *Calidris alpina* and Broad-billed Sandpiper *Limicola falcinellus* were found at the fewest sites. Dunlin, Avocet and Little Stint *Calidris minuta* had the most similar distributions whereas Lapwing and Ruff showed the highest dissimilarity from the distributions of other species.

At the local scale, Ruff, Dunlin and Redshank showed the highest variability in microhabitat choice, whereas Kentish Plover *Charadrius alexandrinus*, Ringed Plover *Ch. hiaticula*, Little Stint, Black-tailed Godwit *Limosa limosa* and Avocet were the most restricted in the microhabitats they used.

The interspecific overlap of distribution at a regional level was often accompanied by microhabitat segregation between the same species. This was especially evident among morphologically different, unrelated species such as Dunlin and Avocet. A high interspecific overlap of microhabitats was common for congeneric species with similar morphology, such as Dunlin and Little Stint or Kentish Plover and Ringed Plover. It is probable that such species pairs compete

with one another for food resources. Dunlin and Little Stint, for example, not only have similar feeding ecologies, but there was also a high similarity between their distributions at both regional and local scales.



During the conference excursion along the Hel peninsula, participants were watching small, black creatures on the water. From the distance they looked like Coots, but this wasn't the case.



**The Bothnia Line and farmland birds:  
waders are among the key-species in monitoring  
the impact of a new railroad on breeding birds**

Adjan de Jong

*Animal Ecology, SLU, SE 901 83 Umea, Sweden  
email: adjan@telia.com*

A new 190 km railroad, the Bothnia Line, will be built between Nyland and Umeå along the Gulf of Bothnia in the north of Sweden. Construction will take nine years (2000–2008) and the price tag is € 1 billion.

Agriculture in this region is generally extensive and small-scale. Therefore it contributes strongly and positively to the biodiversity of the Taiga. Fair densities of Eurasian Curlews and Lapwings breed on farmed land while several other waders breed in the agricultural landscape at large. Farmed land is also important for migrating waders, especially Golden plovers and Ruffs.

Thirteen plots along the proposed railroad track and six control plots are territory-mapped each year. Lapwing, Eurasian Curlew, Little Ringed Plover, Snipe, Green Sandpiper and ten non-wader species were selected for the study. Four phases (initial state, construction phase, railroad without traffic and railroad with traffic) will be compared. Fragmentation and differences in response between species are important issues.

This is a long-term study and to date only a few preliminary results are available. These include:

- Curlews appear to be more sensitive to disturbance by construction work than Lapwings.
- Substantial numbers of migrating waders roost on farmland in summer (June–July).
- Most observations of Ortolan Buntings are made on patches of clear-cut forest adjacent to agricultural land.

For information about the Bothnia Line, look at:  
[www.botniabanan.se](http://www.botniabanan.se)

**Potentially pathogenic fungi isolated from waders  
(Charadrii)**

Iwona Kisicka & Maria Dynowska

*Institution of Mycology UWM in Olsztyn, Centre of  
Biology, ul. Oczapowskiego 5, Olsztyn, Poland*

Wading birds, as organisms connected directly with the water environment, are one of the epidemiological chain-links in the circulation of pathogenic fungi, both in the natural environment and in the environment of man. Many fungi found in birds do not cause pathological changes in them because of their high body temperature. However, the same fungi (e.g. *Cryptococcus neoformans*) in the human body can cause very serious diseases. Water ecosystems, especially those that are polluted, eutrophic, or subjected to strong anthropoppression, are natural reservoirs of potentially pathogenic fungi and thus they can be sources of mycoinfections.

Birds, like mammals, can be infected with fungi through natural openings in the body and penetration is most often through the respiratory or digestive systems. The progress of the infection is influenced mainly by the general physiological condition of the animal infected. Mycotic infections

develop mostly in birds that have been weakened, e.g. by exhaustion following migration or by the presence of external or internal parasites. Young birds are generally more susceptible to mycosis than adults. The progression and expansion of mycoinfections is influenced by climatic conditions (humidity and temperature), pollution, the degradation of the environment, and the density of the population.

During 1999–2000, preliminary research was conducted in the Reda mouth, Gulf of Gdańsk, Poland, with the aim of determining the role of birds in spreading potentially pathogenic fungi. Material was analysed from the throats of 49 young birds (42 Dunlins *Calidris alpina* and seven Ringed Plovers *Charadrius hiaticula*). In 20 birds, five species of yeast-like fungi and one species of mildew fungus were found. Three fungi colonies isolated were classified only to genus. Most pathogenic fungi isolated from the birds were: *Candida albicans* (found in nine birds), *Cryptococcus neoformans* (in four birds) and *Aspergillus* sp. (in three birds). The results indicate a need of more intensive research on mycoinfections in waders, aimed at completing (so far as possible) the list of fungi species potentially pathogenic for man that are carried by these birds.

**The dynamics of wader numbers during spring  
and autumn migration in the bird refuge of  
Bagno Morg, Poland**

Jacek J. Nowakowski & Andrzej Oleksa

*Department of Ecology and Environmental Protection,  
Warmia & Masuria University, 10-561 Olsztyn,  
Żołnierska 14, Poland  
e-mail: jacekn@matman.uwm.edu.pl*

This study was conducted during 1991–93 in the bird refuge of Bagno Morg, located in the NE part of Ilawa Lake District, NE Poland. The refuge comprises 185 ha of open waters, rushes and meadows. The protected area borders directly on the town of Morg, but is otherwise surrounded by agricultural land. Censuses were carried out every five days between 15 February and 10 November in each year of the study.

Eighteen species of waders were recorded during spring and autumn passage. Six species were regular migrants (Lapwing *Vanellus vanellus*, Wood Sandpiper *Tringa glareola*, Redshank *Tringa totanus*, Spotted Redshank *Tringa erythropus*, Ruff *Philomachus pugnax* and Common Snipe *Gallinago gallinago*). Most numerous were Lapwing (max. 400), Wood Sandpiper (200), Ruff (80), Spotted Redshank (50) and Common Snipe (30).

Green Sandpipers *Tringa ochropus*, Greenshanks *Tringa nebularia*, Little Ringed Plovers *Charadrius dubius*, Common Ringed Plovers *Charadrius hiaticula*, Curlews *Numenius arquata*, Whimbrels *Numenius phaeopus*, Common Sandpipers *Actitis hypoleucos*, Grey Plovers *Pluvialis squatarola*, Golden Plovers *Pluvialis apricaria*, Dunlins *Calidris alpina* and Temminck's Stints *Calidris temminckii* were recorded only in some years or occasionally and were not numerous. In each autumn, single Jack Snipe *Lymnocyptes minimus* were recorded.

We describe the dynamics of the passage of the six regular migrants mentioned above in detail.



### Changes in wader numbers in the floodplains of the south basin of the Biebrza river valley, Poland

Jacek J. Nowakowski

Department of Ecology and Environmental Protection,  
Warmia and Mazury University, 10-561 Olsztyn,  
Żolnierska 14, Poland  
e-mail: jacekn@matman.uwm.edu.pl

The number of breeding waders in the floodplains of part of the South Biebrza Basin, Poland, were counted in the years 1989–1999. The study area consisted of a 15 km long section of the river floodplains between its junction with the Narew river and Chyliny village. Counts were carried out from the beginning of April to mid-July.

Fourteen wader species were confirmed to breed in the study area (Lapwing *Vanellus vanellus*, Redshank *Tringa totanus*, Green Sandpiper *T. ochropus*, Marsh Sandpiper *T. stagnatilis*, Common Sandpiper *Actitis hypoleucos*, Black-tailed Godwit *Limosa limosa*, Common Snipe *Gallinago gallinago*, Great Snipe *G. media*, Curlew *Numenius arquata*, Little Ringed Plover *Charadrius dubius*, Common Ringed Plover *Ch. hiaticula*, Ruff *Philomachus pugnax*, Woodcock *Scolopax rusticola*, Dunlin *Calidris alpina*) and one species probably bred (Jack Snipe *Lymnocyptes minimus*). The breeding wader community was dominated by just four species: Lapwing, Redshank, Black-tailed Godwit and Common Snipe. In addition, the following species bred in every year of the study: Common Sandpiper, Green Sandpiper, Great Snipe, Curlew, Woodcock. Common Ringed Plover and Dunlin started to breed in 1991, and Green Sandpiper in 1995. The other species only bred occasionally.

Over the eleven-year study period, the numbers of five species declined strongly. Between 1989–1991 and 1998–1999, Lapwings declined from 380–400 to 100–150 pairs, Black-tailed Godwits from 240 to 40–100 pairs, Redshanks from 100–130 to 40 pairs, Ruffs from 10–16 to 1–3 breeding females and Great Snipe from 10 to 2–5 breeding females. Only the numbers of Curlews increased.

The decline in the numbers of breeding waders correlates with reduced water levels on the floodplains, which has led to significant changes in the vegetation. Also changes in agriculture management since 1990 have altered vegetation cover. Many pastures, grasslands, and peatlands have undergone successional changes leading to reedbeds, shrubby Salix, and encroachment by tree species.



Visiting the sealarium was really exciting.

### Management techniques for breeding waders on lowland wet grassland

Mark Smart<sup>1</sup>, Jennifer Smart<sup>2</sup>, Catherine Joiner<sup>2</sup>,  
Nick Wilkinson<sup>1</sup> & Mark Bolton<sup>1</sup>

<sup>1</sup> Royal Society for the Protection of Birds, The  
Lodge, Sandy, Beds, SG19 2DL, UK  
e-mail: markandjen@buckenham.fsnet.co.uk

<sup>2</sup> School of Biological Sciences, University of East  
Anglia, Norwich, NR4 7TJ, UK

The Royal Society for the Protection of Birds purchased Buckenham and Cantley Marshes (900 acres) in the Norfolk Broads in 1993. At this time there were small numbers of breeding waders (<20 pairs). By changing water management and grazing regimes the number of breeding waders has now risen to approximately 200 pairs.

In order to make appropriate management recommendations for other wet grassland sites and to justify their further development, it is necessary to test these management techniques in a scientific way.

In this poster we present the results of two research projects: (1) to test the effects of different grazing densities on breeding lapwings using an experimental set-up and (2) to examine nest-site selection and chick foraging distribution in lapwings in relation to wet features in marshes, principally foot drains (shallow, gently sloping ditches about 2 m wide and 30 cm deep that allow water to be retained on marshes into the breeding season and provide edge habitat for foraging).

### The original plumage coloration of the genus *Haematopus* – black or pied?

Larisa Stepanova

Department of Zoology and Ecology, Moscow  
Pedagogical University, Street Kibalchicha 6,  
building 5, Moscow, 129278, Russia  
e-mail: oystercatcher@mail.ru

There are two opinions concerning the origin of oystercatcher colouration. Some consider that the pied pattern derived from black birds (Heppleston 1973), others hold the opposite view (Hockey 1996). However, neither give full explanations for their opinions. Probably, the ancestral coloration of oystercatchers was not black and white (pied) but brownish-black-white because: (1) chicks generally have ancestral coloration and young oystercatchers are of that colour pattern (both pied and black species); (2) there are black species with dorsal brownish-black coloration (*H. ater*, *H. bachmani*) and pied species with brownish-black upper part of body, and black head, neck and tail (*H. palliatus*); (3) all brownish black and brownish-black-white species are distributed close to the supposed radiation centre of the genus; (4) Feumelanin providing brownish-black colour is more ancient than eumelanin providing pure black colour. Therefore it seems likely that in all other species of the genus, black replaced brownish-black. The replacement might have taken place either to meet changed habitat demands or for some other reason.

The pied colour pattern of oystercatchers is considered to be an adaptation to the seashore habitat as it has been shown to be more cryptic than completely black plumage (Lauro 1994). However, both black and pied species have rather low



breeding success due to the intensive predation by Corvidae and Laridae (Rudenko 1988, Hockey 1996). Thus the cryptic role of plumage patterns seems to be of questionable value. Monochromic black plumage is supposed to be an adaptation to intensive solar radiation (most black species are distributed near the equator), but pied oystercatchers living in this area are as viable as black ones (Hockey 1996).

Strong contrast, black-white or completely black plumage combined with red bill and iris are identification features that may assist birds to find mates over large distances. However, several species among both black and pied oystercatchers differ from each other only in morphological parameters. Black species sometimes hybridise with pied ones, especially in the areas of low density (Jehl 1978). Moreover the black morph of *Haematopus unicolor* commonly form pairs with the pied morph (Baker 1975). Therefore plumage coloration does not lead to complete reproductive isolation.

The reasons for the evolution of coloration in oystercatchers are probably connected with their social system. All species are as territorial during the breeding period as the European Oystercatcher (*H. ostralegus*), individuals of which must select an appropriate strategy in order to establish a nesting territory, find a partner and maintain them (Ens 1992). Bright coloration may help territory holders to identify intruding conspecifics at a distance allowing them to prepare to defend their territories. Even immature birds have strong coloration and this may make them vulnerable to attack and injury by territory holders. Therefore bright coloration may be better for the social system of the species, but not necessarily for the individual. However, oystercatchers, which are powerful birds, also have behavioural mechanisms that tend to prevent actual fights and to restrain aggression between territory holders and non-breeders. Both pied and black species perform piping displays (show red bill) and false sleeping (hide red bill), but pied species also use postures that draw attention to white patterns; for example, on the neck and wing (*H. ostralegus*) and on under tail coverts (*H. leucopodus*) (Makkink 1942, Miller & Baker 1980).

Therefore it seems that an original cryptic brownish-black dorsal and white ventral coloration of oystercatchers may have been replaced by strongly contrasting colours as plumages have been changed through the evolution of social systems and territorial relationships. In turn, these new plumages may have led to the development of special behaviour patterns.

#### **Day- and night-time activity of Redshanks *Tringa totanus* breeding in Wadden Sea saltmarshes**

Stefan Thyen, Klaus-Michael Exo & Jutta Leyrer

*Institut für Vogelforschung "Vogelwarte Helgoland",  
An der Vogelwarte 21, 26386 Wilhelmshaven,  
Germany*

*e-mail: stefan.thyen@ifv.terramare.de*

In the context of studies of the population biology of Redshanks breeding in the Wadden Sea saltmarshes of the Jade Bay, Germany, daily activity patterns of adults were recorded in 2001 and 2002. As revealed by data loggers measuring nest temperatures continuously for 5–21 days of incubation ( $n = 5$  nests), Redshank clutches were incubated discontinuously. Among clutches, the average number of interruptions per day ranged up to a maximum of 5.4 (one interruption is

defined as  $\geq 30$  min of absence) and the average duration of interruptions per day ranged up to a maximum of 3.2 h. Altogether, the mean duration of absence of incubating adults was 8.02 h per day, i.e. 33.4 % of the day.

Adults interrupted incubation more frequently but for shorter periods during daylight than during darkness. During daylight, adults were absent for 37.3% of the time, whereas nests were uncovered for 26.3% of the time at night. Preliminary results of radio-tracking breeding birds during several 24-h sessions showed that individual adults spend considerable parts of the night on adjacent tidal flats rather than on the saltmarsh or at the nest site. This ratio was reversed in daylight. Factors related to feeding ecology and to high predation pressure are proposed as possible causes of this behaviour, which is different from that observed in the saltmarshes of the Wadden Sea island of Wangerooge in the 1950s.

#### **Cockles, oystercatchers and the conflict between nature values and commercial exploitation**

Simon Verhulst, Bruno J. Ens, Kees Oosterbeek & Anne Rutten

*University of Groningen, PO Box 14, 9750 AA Haren,  
The Netherlands*

*e-mail: k.h.oosterbeek@alterra.wag-ur.nl*

Conflicts between nature values and commercial exploitation of natural resources are common. A classic example is the conflict between fisheries and birds. The cockle fishery in the Dutch Wadden Sea has increased in recent years due to the introduction of intertidal suction-dredging. Oystercatchers feed mainly on cockles and mussels in winter, and oystercatcher numbers and reproductive success have declined strongly in the past decade. We used an experimental approach to assess the consequences of cockle fisheries for oystercatchers. 30% of the Wadden Sea has been closed for shellfish fisheries since 1993, and cockle density is now six times higher in the closed areas. We made the assumption that on average there are no other differences of importance between open and closed areas. We caught oystercatchers at different sites and compared diet and body condition between areas open or closed for cockle fishery. We used new physiological measures of condition, which are validated by relating them to survival and reproduction. We further compared oystercatcher densities, because an ideal free distribution between open and closed areas could prohibit variation in body condition.

#### **Clay-pits in the Wadden Sea saltmarshes: attractive staging and feeding sites for migratory waterbirds?**

Sabine Wenzel, Klaus-Michael Exo,  
Birgit Neumann & Stefan Thyen

*Institut für Vogelforschung "Vogelwarte Helgoland";  
An der Vogelwarte 21, 26386 Wilhelmshaven;  
Germany, e-mail: binespost@t-online.de*

At the end of the 1990s, clay was removed from the Wadden Sea saltmarshes in the course of coastal protection measures. As the construction site is located in the National Park of Lower Saxony, Jadebusen, Germany, and because of the



international importance of the area for migratory waterbirds, such as Shelduck, Avocet and Curlew, federal legislation calls for an extensive research programme to analyse ecological impacts. In order to identify any effect of the clay-pit, the numbers and spatial distribution of migratory waterbirds were investigated by spring-tide counts in 2001. Time and space patterns of the most abundant species were also assessed by behavioural observations in the impact area in comparison with an adjacent reference site on intertidal flats.

In respect of the macrozoobenthos, the clay-pit was proved to be a habitat similar to the adjacent mudflat. In spring, biomass was dominated by polychaetes, such as *Nereis diversicolor*, at both sites, whereas in autumn mudsnails *Hydrobia ulvae* were most abundant in the pit and polychaetes on the adjacent mudflat. However, biomass was higher in the pit than on the mudflat in both seasons. The most abundant bird species visiting the clay-pit in spring were Dunlins and Redshanks, in autumn Avocets and several duck and gull species. In spring, most of the birds fed on polychaetes, whereas in autumn polychaetes, crabs *Carcinus maenas* and mudsnails were the main food. The number of birds and their feeding times in the pit were lower than on the mudflat despite higher biomass in the pit. The energy intake of most of the birds studied did not differ between study plots, neither in spring nor in autumn. Thus, the clay-pit appears to be of relatively low importance for the majority of the staging birds. In addition to food supply and availability, predation pressure and limited space in the pit were probably further important factors determining its comparatively restricted use.

#### Wintering waders in Italy: distribution, numbers and trends in 1991–2000

Marco Zenatello, Nicola Baccetti, Lorenzo Serra

*INFS, via Ca' Fornacetta 9, I-40064 Ozzano Emilia BO, Italy; e-mail: infs.mz@iperbole.bologna.it*

Updated numbers and distributions of wintering waders in Italy in 1991–2000 are presented, according to the results of IWC counts in 615 wetland systems (counting sites lumped according to the principle of functional or ecological unit). Positive (site censused, species counted) as well as zero counts (site censused, species absent) were input to the database and used to produce population estimates and distribution maps.

All areas where a species was present in at least one year during 1991–2000 were considered as potential sites for that species. Potential sites were divided into three categories: (1) occupied sites, i.e. sites were visited and species was present in that year, (2) un-occupied sites, i.e. sites were visited, species was absent (although present in at least one year during 1991–2000), (3) un-surveyed sites, i.e. sites where the species was present at least once in 1991–2000 which were not visited in that year.

In addition to yearly totals, given for each species, two indices were calculated. A coverage index (number of sites visited in every year divided by the number of potential sites) was used to show how much of the potential distribution of a species was covered by counts in each year. A distribution index (number of sites where a species was present in a given year divided by the number of potential sites which were visited in that year) highlighted year-to-year variations of the

size of the national wintering range.

A total of 33 species was recorded, including such occasional winter visitors as Whimbrel, Slender-billed Curlew, Marsh Sandpiper, Wood Sandpiper, Temminck's Stint and Red-necked Phalarope. The highest number of waders was found in 1997 (138,877). Most abundant species were Dunlin (average 1996–2000: 62,534) and Lapwing (48,739). The latter was also the most widespread species, followed by Common Snipe, Common Sandpiper and Kentish Plover. Internationally important numbers of Avocets were counted regularly at Manfredonia-Margherita di Savoia (average 1996–2000: 1187, 35% of the Italian population). The lagoons of Venice and Grado-Marano hosted internationally important numbers of Dunlins (respectively 23,720 and 15,880, 66% of the Italian population). The latter site nearly qualified as internationally important for wintering Grey Plovers (1,407, 53% of the Italian population). For 18 species, an abundance index and a population trend for 1993–2000 were calculated using TRIM (TRENDS and INDICES for MONITORING data, version 3, Pannekoek & van Strien 2001). A substantial population increase was found in 10 wader species, a substantial decrease in 4 (Black-winged Stilt, Avocet, Kentish Plover and Little Stint) and a poorly known trend in 4. The data confirm the utmost importance of the North Adriatic wetlands (the lagoons of Venice and of Grado-Marano, the Po Delta and the Cervia salines) for wintering waders, as well as some large concentrations in the central and southern wetland complexes (Manfredonia-Margherita di Savoia, coastal wetlands of Sardinia, Tuscany and Latium).

#### Autumn migration of Sanderlings *Calidris alba* at the Vistula river mouth, 1983–2000

Monika Zielińska & Piotr Zieliński

*Institute for Ornithology, Polish Academy of Sciences, ul. Nadwiślańska 108 80-680 Gdańsk, Poland e-mail: monicz@stornit.gda.pl*

Sanderlings occur regularly at the Vistula river mouth during autumn migration, but only in small numbers. The largest flock recorded was 160.

Each autumn during the 18 years 1983–2000, waders were caught between mid-July and the end of September in 30–40 Ottenby walk-in traps along the seashore and riverbank. A total of 689 Sanderlings, 141 adults and 548 juveniles, were captured, varying between 0 and 113 in a single year. Over the years, the percentage of juveniles varied between 25% and 98%.

The pattern of catching shows two peaks: one in pentade 42 (25–29 July), comprising adults and the second in pentades 51–52 (8–17 September) comprising juveniles. The first young birds were caught in pentade 45 (9–13 August). Mean body mass was relatively low: adults, 51.6 g (range 39–69 g); juveniles, 52.8 g (38–81 g). Only four (3%) of the adults were caught more than once in the study area in the same season. On average, they stayed for only 1.7 days. Juveniles stayed longer (5.6 days) with 10% caught more than once.

Retraps showed that the change in body mass was negative on first day after the capture (–1.31 g) and positive for birds caught subsequently (0.98 g/day). In total, 25 long-term recoveries were obtained (3.6% recovery rate).



Four Sanderlings with foreign rings were caught or seen (Great Britain 3, Germany 1) and 21 ringed at the Vistula mouth were recovered abroad (Great Britain 8, the Netherlands 5, Germany 4, France 1, Ghana 1, Ivory Coast 1, Ice-

land 1). Winter records were from Great Britain and the Netherlands, but autumn and spring recoveries from Ghana and Ivory Coast indicate that Sanderlings migrating through the Vistula river mouth also winter in Africa.

## Workshop on the project "Tringa glareola 2000" – Abstracts of talks

### Overview of the project "Tringa glareola 2000"

Magdalena Remisiewicz

WRG KULING, Dept. of Vertebrate Ecology and Zoology, Univ. of Gdańsk, al. Legionów 9, 80-441 Gdańsk, Poland, e-mail: biomr@univ.gda.pl

The project "Tringa glareola 2000", conducted since 1997 by the KULING group at the University of Gdańsk under the auspices of the WSG, aims to coordinate international studies of Wood Sandpiper migration. The project has generated so much interest that, up to 2002, 40 Wood Sandpiper sites in 26 countries have been covered (17 in Europe, 7 in Africa and one in Asia). At 30 sites, migration has been studied throughout 1997–2002 and for 10 more data from preceding years has been provided.

The two main study methods are ringing and regular counts. Wood Sandpipers have been caught at 21 project study sites and this has been supplemented with archive ringing data from nine more locations. Colour marking has been carried out at 11 sites. Thanks to the vigilance of bird-watchers, the re-sighting rate is 1% (twice as high as the recovery rate from ringing). Biometric data have been collected from about 3,000 birds caught during spring migration, 8,000 autumn migrants and 1,500 in winter quarters. Regular counts have been conducted in spring at 13 sites and at 21 in autumn. These data are supported by observations of Wood Sandpipers at other migration sites in Europe and Africa.

During three project workshops, participants have discussed methods and the planned final output. During the next two years, the material collected up to the autumn of 2002 will be analysed by specialist groups, focussed on such topics as: flyways, migration dynamics, biometrics, energetics and migration strategy (including moult), and key sites.

### Aspects of spring and late-summer passage of Wood Sandpipers in Belarus during 2001–2002

Edward Mongin

Institute of Zoology, Akademichnaya Str. 27, Minsk 220072, Belarus, e-mail: mongin@biobel.bas-net.by

Regular surveys of Wood Sandpipers were carried out during spring 2001 at 14 sites in both the south and north regions of Belarus. Peak passage occurred at the beginning of May.

Late-summer passage was studied at a site on the Pripyat River floodplain from July to the beginning of August in 2001 and 2002. Peak passage, relating mainly to adults,

occurred in the last ten days of July. At the end of July, the predominant age-class switched to juveniles.

Ninety-six birds were caught during late-summer passage. Statistically significant differences between juveniles and adults were revealed in wing-length ( $p < 0.001$ ), tail-length ( $p < 0.005$ ), tarsus-length ( $p < 0.05$ ) and weight ( $p < 0.005$ ). The length of wing, tail and tarsus in juveniles was higher than in adults. For wing and tail, the difference almost certainly arises because of feather-wear in adults; whereas for tarsus, the difference can probably be explained in terms of bone calcification in juveniles. Temporal changes in body mass and fat reserves were recorded in both adults and juveniles and would have been associated with migration strategies.

### Twenty five years of Wood Sandpiper ringing from southern Africa

Dieter Oschadleus and Les Underhill

Avian Demography Unit, University of Cape Town, Rondebosch, 7701, South Africa  
e-mail: dieter@adu.uct.ac.za

All SAFRINGS Wood Sandpiper ringing data from 1975 to the present, (July 2002) has been computerized by Nosi-thenbele Bali, as well as all earlier data that could be traced. This comprises 1,865 records altogether, plus 14 recoveries and 16 recaptures. Here we present the ringing and recapture data (the recovery data having been published elsewhere).

3,781 Wood Sandpipers were ringed in southern Africa, between 1948/49 and 2002. Most were caught in mist-nets or walk-in traps. Numbers caught from year to year have been irregular, but the most effort occurred in the 1970s when 150–300 were ringed annually (Fig. 1). Most (1,243) were caught by one person, Tony Tree.

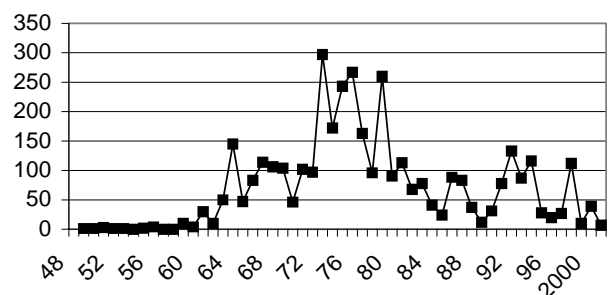


Fig. 1. Numbers of Wood Sandpipers ringed in southern Africa during 1948–2002.



Wood Sandpipers arrive in southern Africa during August and September and some have reached the eastern Cape by the first week of August.

Departure takes place in March and April. Ringing records indicate a gradual departure during April. That some birds over-winter (probably all immatures) is confirmed by ringing records for Zimbabwe of three caught in May and two immatures in June.

### Studies of Wood Sandpiper migration in southern Belarus

Pavel Pinchuk

*Institute of Zoology, Akademichnaya Str. 27, Minsk 220072, Belarus, e-mail: bym@biobel.bas-net.by*

Wood Sandpiper *Tringa glareola* migration was studied in the floodplain meadows of the Pripyat river in the vicinity of village of Turov, Belarus (52°05'N, 27°45'E).

Regular counts along standard routes were carried out in 1998–1999 from the end of June to mid-October and in 2000–2002 from early April to late September. Counts were made twice every five days.

Regular wader catching, using 4–12 walk-in traps, started in August 1999. A total of 342 Wood Sandpipers were caught, 145 during spring passage and 197 during autumn passage. All were banded with metal rings and 157 were marked with colour rings; 69 in spring and 88 in autumn.

Spring migration lasted from the second half of April to the end of May with a peak in the first half of May. Autumn passage lasted from the end of June to early October. The peak migration of adults was in mid-July and juveniles followed from August onwards.

There were no significant differences in measurements and body mass in the Wood Sandpipers caught in Southern Belarus in comparison with birds caught in neighbouring countries. There was one foreign recovery from Lithuania.

### Spring and autumn Wood Sandpiper migration in NE Austria

G. Wichmann<sup>1</sup>, J. Barker, T. Zuna-Kratky, K. Donnerbaum, & M. Rössler

<sup>1</sup> *Verein AURING, Biologische Station Hohenau-Ringelsdorf, Weststraße 7, A-2273 Hohenau e-mail: wichmann.birdlife@blackbox.net*

This study was conducted at Hohenau in the extreme north-east corner of Austria, in the lowlands close to the River March and the borders with Slovakia and the Czech Republic.

As in other parts of Europe, the numbers of Wood Sandpipers in spring (maximum count 104) are lower than in

autumn (234). Migration of adults in autumn appears to be divided into two groups: one peaking in pentade 37 and a second in pentade 41. The bill-to-skull measurements of these two groups are significantly different, which supports the idea that they are distinct (Mann-Whitney:  $n = 20$ ;  $z = -3.782$ ;  $p < 0.000$ ). The peak of juvenile migration in autumn is around the end of July and beginning of August. As the season progresses, we tended to catch heavier birds with higher fat scores. The importance of small migration stopover sites is the currently being investigated.

### Wood sandpiper ringing at Jeziorsko dam reservoir, Poland

Radoslaw Wlodarczyk<sup>1</sup> & Artur Pedziwilk<sup>2</sup>

<sup>1</sup> *Dept. of Teaching Biology and Biodiversity Studies, University of Łódź, Banacha Str. 1/3, PL- 90-237 Łódź, Poland, e-mail: wradek@biol.uni.lodz.pl;*

<sup>2</sup> *Students' Ornithological Section, University of Łódź, Banacha Str. 1/3, PL- 90-237 Łódź, Poland*

The Students' Ornithological Section from University of Lodz has used the Jeziorsko reservoir as a ringing site since 1989. Each summer, the water level drops and this creates good feeding conditions for migrant waders, which have been caught in large numbers using walk-in traps and mist nets. The numbers of traps and nets have changed from year to year: 32 traps and four mist nets were used in 2002. Mostly, three species of waders are caught: Wood Sandpiper, Common Snipe and Common Sandpiper.

During two months in 2002 (20 July to 10 September), 678 Wood Sandpipers were caught. This brings the total number ringed over the past 14 years to 4,051. Nearly half the birds were also colour-ringed for the project *Tringa glareola* 2000. All birds were aged and weighed and the following measurements were also taken: wing-length (maximum chord), total head length, bill-length, bill-length from the tip to the nostrils and tarsus-length. Additionally fat-score was recorded in order to assess the body reserves of migrant Wood Sandpipers and Common Snipes.

A comparison of weights of juvenile Wood Sandpipers from the two first weeks of August indicates that fat reserves differ significantly between years. Data from retraps show that juveniles quickly build their fat reserves at Jeziorsko, gaining up to 30 g in two weeks. This is different to Common Snipe, which gain weight at a slower rate and stopover for a longer period. This probably arises because of the different migration patterns of the two species. Wood Sandpipers have to fly much further to their wintering grounds that are situated further south than those of Common Snipes.

Despite the large number of Wood Sandpipers that have been ringed, only seven have been found in other parts of Europe. Similarly, it is surprising that there have not yet been any re-sightings of colour-ringed birds from Jeziorsko.

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