Annual Conference – Abstracts of posters

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

☆ **First prize:** ***Age-independent telomere length as a molecular marker for individual quality in a wader*** by Angela Pauliny, Richard H. Wagner, Jakob Augustin, Tibor Szép & Donald Blomqvist

☆ **Second prize:** ***Effects of winter habitat quality on timing of migration*** by Jose Alves, Becca Hayhow, Tomas Gunnarsson, Peter M. Potts, William J. Sutherland & Jennifer A. Gill

☆ **Joint third prize:** ***Day- and night-activity in waterbirds and in their benthic prey*** by Wiebke Esser & Michael Exo

☆ **Joint third prize:** ***Time budgets of Northern Lapwing chicks during the first days after hatching*** by Lucyna Woloszyk, Wlodzimierz Meissner & Paulina Piasecka

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Interhabitat connectivity of two feeding patches of waterfowls at Palaui Island Marine Reserve, Sta Ana, Cagayan Philippines

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"Linkages in the landscape" is an emerging concept in Protected Area Management, featuring the role of corridors and connective strips in enhancing biodiversity flow and interactions between and among similar or distinct ecozones. The Philippines is richly endowed with diverse flora and fauna, as well as ecosystem types. As an archipelagic country consisting of 7,100 islands, it has been a good wintering and foraging grounds of many wader species from the north and south hemispheres. However, Protected Area Zoning in the country is said to be far from ideal because of too regimented spatial delineation of buffer zones, oftentimes without direct relationship to the structural and functional interactions of life forms between interconnected ecosystems.

The poster highlights the importance of considering the connectivity of two types of wader habitat as a basis for assessing the appropriateness of the zoning plan for Palaui Island Marine Reserve. The two feeding sites were characterized through vegetation analysis, benthic faunal assessment and waterfowl count. Social survey was also carried out to assess the demographic pressures and politico-institutional factors that affect the ecological integrity of the waterfowl habitats. The eastern part of the island is a suitable overwintering site for waterfowl because of the vast intertidal flats that provide good feeding grounds and roosting sites. Their habitat is vulnerable to human disturbance as these zones are also used for livelihood activities of the local communities. Social survey revealed that the current socio-economic, cultural and politico-institutional conditions of the island have less bearing on the integrity of the waterfowl habitat. However, if present trends of demographic pressure persist, coastal marine resources could be degraded and eventually people will shift to farming and other land-based resource livelihood activities, thus affecting the waterfowl habitats.

Effects of winter habitat quality on timing of migration

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Timing of arrival on the breeding grounds can be of great importance to migratory species, as early arrival can improve access to higher quality resources and breeding locations, and can increase the potential number of breeding attempts. Recent work on the Icelandic Black Tailed Godwit *Limosa limosa islandica* has shown that winter habitat quality is the strongest individual predictor of arrival times, and that individuals occupying good breeding habitats also tend to occupy good winter habitats. Variation in arrival times could thus be influenced by breeding and/or winter habitat quality. Using a unique dataset of individual colour-ringed godwits and with the help of keen observers across the range, we were able to determine the wintering location of many individuals of this highly philopatric subspecies. Here we explore the habitat quality experienced by individuals wintering at four distinct locations across the range and its implications for the timing of spring arrival in Iceland. In addiction, we explore the migratory routes of birds from these four locations and how the timing of arrival in Iceland varies with migratory route.

Decreasing trend of shorebirds at Japanese stopover sites in the East Asian Australasian flyway

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In Japan, 40% of the former area of tidal flats has been lost in the past 50 years. Nationwide surveys of shorebirds have been conducted in Japan since 1973. The most recent survey, conducted in 2004 by the Ministry of Environment at *c.*100 sites, recorded 57 species (79,284 birds) during northward

migration, 55 species (40,615 birds) during southward migration, and 42 species (53,430 birds) in the non-breeding season. In the last five years, the number of individuals of dominant species has not shown any increasing or decreasing trend, but the maximum number of Dunlin shows a decreasing trend (contrary to the lack of any trend in one-day census data). A comparison of monitoring data from 1973–1985 and 2000–2003 shows estimated decreases in total numbers of shorebirds of at least 40% during northward migration (with significant decreases in Kentish Plover, Great Knot, Ruddy Turnstone, Eurasian Curlew and Spotted Redshank) and at least 50% during southward migration (with significant decreases in Kentish Plover and Dunlin). On the other hand, numbers of a few species increased significantly during northward migration (Eurasian Oystercatcher and Black-winged Stilt) and during southward migration (Eurasian Oystercatcher, Black-winged Stilt, Greater Sandplover, Grey Plover, and Sanderling). Habitat degradation and land reclamation in Japan are likely to be among the reasons for the observed decreasing trends of many shorebirds.

Effect of vegetation height in grassland on breeding Northern Lapwings *Vanellus vanellus* distribution: the choice between pasture and arable lands

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Although Northern Lapwings are abundant in Europe, the number of breeding birds has been decreasing for several decades, in France as well as in the rest of W Europe. However, in W France, in a 12,000 ha wetland area, this trend seems to be the reverse. Absent as a breeder in the marsh of Brouage until the 1970s, lapwings colonised and the population grew until 1996, before stabilizing. This trend may be linked to the absence of cold winters in the region since 1986, and to the settlement of wintering birds, but also to an improvement in the habitat quality of pastures. However, in more recent years pasture management has been reduced in intensity, and at the same time there has been a change in the breeding distribution of lapwings. Now, they tend to nest on arable land rather than pasture. The aim of our study in 2006 was to determine whether the two events were linked by using data collected since 1996, and so to show whether there is a relationship between vegetation height in grassland and whether lapwings breed there or re-distribute to arable land.

Unusual occurrence of summering Red Knot *Calidris canutus* on a small rocky island in the western Irish Sea

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Rockabill, at 53°30' N 6°00'W, lies approximately 6 km off the north County Dublin coast in the west central Irish Sea. It comprises two small, granite islands totalling 0.9 ha, of which >50% of the main island is covered by a lighthouse and associated buildings. The island supports around 2,500 pairs of three species of tern as well as breeding Kittiwakes and Black Guillemots and is looked after by a warden from the beginning of May to early August each year. Few waders occur during most of June and July, apart from small flocks of Ruddy Turnstones and Purple Sandpipers on the intertidal rocks, which are dominated by barnacles and mussels. Small numbers of other waders, presumably on passage, occasionally join the turnstone/Purple Sandpiper flocks, such as Dunlin, Red Knot and Sanderling.

In 2006, the first three knots were seen on 9 May, three days after our arrival. This was the beginning of a remarkable occurrence of knots throughout the summer. Up to the end of July, we saw knots on 91 occasions. Mean flock size was 218, and we recorded a total of 19,859 bird/days. The maximum flock size was 170 in May, 1,500 in June and 700 in July. Most were in grey non-breeding plumage, though 9% were wholly or partly red. The activity of these birds on 18,010 bird/days was recorded. Only 2.9% were foraging, whereas 40.5% were roosting. The remainder (56.6%) were first recorded in flight, which often lasted for remarkably long periods (10–60 min), before the birds departed from or landed on the island. In our presentation, we explore the relationship between the occurrence of knots on Rockabill and diurnal and tidal cycles, and give a preliminary indication of potential prey availability. Such numbers of knots have not been recorded previously in mid summer in Ireland and why an offshore rocky island 25 km to the northeast of Dublin Bay and 40–45 km to the south-east of Dundalk Bay, their two principal wintering grounds on the east coast of Ireland, became an area of intense activity remains something of a mystery.

Breeding success of waders in the Bug and Narew valleys, E Poland

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The river valleys of E Poland (the Biebrza, Narew and Bug) have traditionally supported large breeding populations of grassland waders, mostly Northern Lapwing, Black-tailed Godwit, Common Snipe, Redshank, but also Ringed Plover, Ruff and Great Snipe. Over the last decade, however, numbers have declined considerably across the whole region. On the Bug river, the population of Ringed Plovers breeding on riverside pastures has declined by *c.*50% since the mid 1990s. Bug populations of lapwing and Black-tailed Godwit apparently crashed after 2002. These findings triggered research aimed at determining possible reasons for the declines. In 2004–2006, the nesting success of waders was studied on multiple plots in the Bug and Narew valleys. Additionally, nesting success of Ringed Plovers breeding along the Bug was analysed using a series of breeding records dating back to 1992. Generally, in 2004–2005, nest success of all species studied was extremely low at an average of 7%. This was mostly due to predation by mammals, chiefly Red Fox, and

to a lesser extent by Hooded Crows. Population viability analysis showed that, currently, nest predation alone is sufficient to drive local wader populations towards rapid extinction. Moreover, a 14-yr dataset for Ringed Plover shows that clutch predation was much lower in the early 1990s and increased to the current level around 1995–1997.

Monitoring of colour banded Red Knots *Calidris canutus rufa* that stop over in Peninsula Valdés, Argentina

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The Red Knot is a long distance migrant that stops over on the beaches of Peninsula Valdés, Argentina, during northward migration from Tierra del Fuego to the Canadian Arctic. As part of a monitoring program of the *rufa* knot population, we have surveyed the beaches and mudflats of two bays on Peninsula Valdés: Fracasso (San Jose Gulf) and Colombo (Nuevo Gulf).

Information on the re-sighting of ringed birds was used to evaluate site fidelity, stopover duration and migratory movements. The area was visited during the migration seasons of 2004–2006. Using binoculars, telescopes and digital photographs we made complete surveys of the study areas and scans for colour bands. Information on individually marked birds showed that 25% of those seen in 2004 were seen again in 2005, while 90% of birds seen in 2005 and 58.3% seen in 2004 were seen again in 2006. Three birds with individual colour combinations were observed in each of the three consecutive seasons and five birds were seen in both study areas on the same day. The latter would suggest that the whole of Peninsula Valdés, or an even bigger area, is used by individual birds as a single feeding/stopover site. Each year the same individually marked birds stayed for the whole stopover period of about a month indicating that it is much the same flock that stops over annually. Maximum counts were close to constant during April (2,000 in 2004, 300 in 2005 (when we made only two visits) and 700 in 2006) decreasing strongly at the beginning of May when they leave to continue their migration northwards. On the one hand the results indicate site fidelity for a group of birds; on the other a decrease in numbers over the years which may reflect a decline in the total population.

Day- and night-activity in waterbirds and in their benthic prey

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In tidal areas shorebirds adjust their activity patterns according to the tidal cycle. Nocturnal activity is not only widespread and common among waterbirds (Anseriformes and Charadriiformes), but in most species essential to meet daily energy demands. However, although several studies have emphasized the importance of nocturnal feeding, quantitative data are scarce and sometimes contradictory. We investigated day and night abundance and foraging activity of several waterbirds (Redshank, Pied Avocet, Grey Plover, Dunlin, Eurasian Oystercatcher, Shelduck, Mallard and Black-headed Gull) in relation to predation risk, food availability, habitat type and moon phase. Observations were carried out in the Lower Saxonian Wadden Sea during spring and autumn migration using a light intensifier at night. Total abundance did not differ between day and night in any wader species, but gulls were more abundant during the day and ducks during the night. However, some species exhibited different habitat preferences during night and day, probably related to differences in predation risk. In all species but gulls foraging activity was higher during the night due to higher food availability and decreased predation risk. Feeding activity did not differ between full- and new-moon phases. Visual observations indicated that the polychaetes *Hediste diversicolor* and *Heteromastus filiformis* were significant more active during the night. The data suppose both the preference hypothesis (that night-feeding is preferred) as well as the supplementary hypothesis (that night-feeding only occurs to supplement day feeding).

Some aspects of Black-tailed Godwit *Limosa limosa islandica* ecology in the national nature reserve of 'Marais d'Yves', Charente-Maritime, France

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The "Marais d'Yves" is one of the national nature reserves of the "Pertuis charentais", which are among the most important wetlands in western France. It is a major site for many migratory water birds, particularly in winter. The reserve includes three main habitats: dune, lagoon and wet grassland. In 1992, Black-tailed Godwits of the subspecies *islandica* started wintering at this site. Since then, the population has shown an exponential increase both on the reserve and nationally. During two winters (2001/2002 & 2002/2003) a detailed survey was undertaken to understand how the species uses the site. We counted the roost on 40 occasions, in relation to tide height, the birds' arrival time, the water level in the lagoon, weather conditions and the birds' precise location. When the godwit flocks fed near the shore, foraging scans (248) were carried out: each bird was observed for two minutes and we counted the number of prey taken, differentiating between round prey (bivalves) and long prey (worms). Godwits fed in a specific strip of the tidal zone, an area that became rapidly submerged by the rising tide. Nine feeding sites in three main areas were identified. During the two winters, there were many differences in their use by the birds: one site might be used regularly in one year and almost deserted the next. The scans showed that the Black-tailed Godwits fed almost exclusively on round/bivalve prey.

Thermoregulatory consequences of moult in Red Knots *Calidris canutus islandica*

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Moult is considered to be energetically expensive for birds. However energy increment for feather synthesis is reported to be relatively low compared with overall daily energy expenditure. Since the plumage of the birds creates an insulation preventing heat loss, thermoregulatory costs should be taken into account as well. Recent studies on Red Knots show the difference in insulating properties of the summer (breeding) and winter plumage, which results in higher thermal conductance (Tc) in summer. So far no detailed study on Tc – the inverse of insulation – during the peak of moult intensity has been performed. We took respirometry measurements of basal metabolic rate – BMR, and Tc from nineteen Red Knots kept in captivity up to eleven years. Birds followed their natural annual cycle and natural photoperiod. To study within-individual changes, we measured BMR and Tc in three periods: in full summer plumage, during the peak of moult intensity and in full winter plumage. Analyses on mass-corrected values show that BMR in moulting birds is significantly higher than in the same individuals in winter plumage and might reflect an increase in energy demands for protein synthesis. The estimated cost of feather synthesis – the increase of metabolic rate over the BMR level – was almost 7%. We did not find any peak of Tc during the highest moult intensity, when the insulating layer is disrupted. Tc during moult was similar to the level in winter. Thus thermoregulatory costs seem to be unaffected by the loss and regrowth of the plumage or by the intensity of its replacement. This suggests that birds can maintain Tc at a constant level between the main post-breeding moult and winter. Theoretically, taking into account only the insulating properties of the plumage, knots would have little difficulty moulting at low temperatures. Overall, our results support the propositions that the cost of feather synthesis is rather low energetically and that there is no detectable thermoregulatory cost during the peak of moult.

Grey phalarope re-uses a former Dunlin nest

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In the summer of 2006, a Grey Phalarope *Phalaropus fulicarius* nest was found at Zackenburg, NE Greenland, the first one since the beginning of the BioBasis monitoring programme in 1995. The nest cup was already marked from the previous season, since it had been constructed by a pair of Dunlin *Calidris alpina*, which successfully hatched four chicks. Little is known about nest re-use in phalaropes, however Dunlins frequently re-use nests in subsequent seasons at Zackenberg. I am interested to know about other cases of nest re-use in phalaropes – both inter- and intra-specific – as well as any information on nest choice by phalaropes and other waders.

The effect of low-level farmyard manure application on invertebrates and soil properties in lowland wet grassland and the implications for breeding waders

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Studies observing poor wader breeding success along with anecdotal evidence from RSPB reserves suggest that invertebrate biomass availability may be low on some areas of lowland wet grassland. This project aims to investigate the potential to increase the availability and abundance of invertebrates, particularly earthworms, to breeding waders through the application of low levels of farmyard manure on lowland wet grassland sites. The effect of farmyard manure spread at rates of 5, 10 and 15 tonnes ha^{-1} on soil invertebrates, epigeal invertebrates and both soil and vegetation properties has been studied in an experimental trial across four RSPB reserve sites over three years. Further studies to investigate the relationship between, farmyard manure, soil invertebrate levels and lapwing foraging response were also carried out in spring 2006.

Managing predation on ground-nesting birds: experimental test of nest exclosures

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Ground-nesting birds have declined world-wide partly due to high nest predation. A non-lethal method for decreasing predation uses protective cages at nests. Such nest exclosures are receiving increased attention from conservation managers in several parts of the world. Evaluations have so far mainly looked at the effect of exclosures on hatching success and adult predation, but several other important traits can also be affected. Here, we test the effect of nest exclosures in two common European shorebirds: Northern Lapwing *Vanellus vanellus* and Redshank *Tringa totanus*, measuring several traits such as hatching success, incubation length, hatching synchrony, hatchability, partial clutch loss, chick condition, and adult predation. In both species, protected nests had significantly higher hatching success than unprotected nests. Taking into account incubation time, nest abandonment, hatchability and partial clutch loss, protected nests still hatched more chicks than unprotected controls. In lapwings, but not in Redshanks, protected nests were incubated longer, but this did not impair the condition of lapwing chicks. Protected Redshanks, however, suffered increased predation on incubating adults, which often sit on the nest until a predator is close by. Our results show that caution must be exercised in the use of nest exclosures, particularly in Redshanks and other species with similar incubation behaviour. Exclosures should, however, be considered as a management tool in shorebirds that leave their nest when an approaching predator is still far away.

Alternative agri-environmental schemes for the protection of meadow birds – examples from Schleswig-Holstein and Lower Saxony, Germany

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In the grassland area "Meggerkoog" situated in the river valleys of the Eider, Treene and Sorge, Schleswig-Holstein, a new and flexible form of agri-environmental scheme was implemented for the protection of meadow birds. Farmers get a single compensation payment of €150–300 for adapted management, if broods of Northern Lapwing, Black-tailed Godwit, Redshank or Eurasian Curlew are located on their fields.

The new flexible compensatory payment received a high take-up rate by local farmers within a few years. In several projects the Michael-Otto-Institut of the NABU studied the effectiveness of the new programme. The results of a 7-year study of the effectiveness of the programme will be presented.

Besides the regular agri-environmental programmes, in some areas of Lower Saxony (e.g. "Stollhammer Wisch", located on the east side of the Jadebusen, Schneckenbruch, an inland site near the city of Osnabrück) additional measures for clutch and chick protection have been started in recent years. Wader nests are marked with small sticks, both on meadows and arable fields. Farmers are thus able to detect the nests and protect them while working in the fields (mowing, sowing etc.). For each clutch not being destroyed by agricultural activities, farmers get a bonus of up to €30. For the protection of chicks, the speed of mowing machines is restricted to 8 km/h. Mowing practices are also restricted in other ways. The success of these measures is documented.

Population numbers and habitat use of the Black-winged Pratincole *Glareola nordmanni* in central Kazakhstan

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The breeding population of the Black-winged Pratincole *Glareola nordmanni* is endemic to the Eurasian steppe biome. The species has been up-listed to 'Near Threatened' in the world Red Data book (IUCN update 2006) due to a historical and accelerated recent population decline. We collected quantitative data on Black-winged Pratincole abundance, breeding biology and habitat use between April and July 2006 in Central Kazakhstan in order to improve the generally limited knowledge on this species. Our study area (31,500 km^2) is situated near Korgalzhyn, Akmolinskaya oblast' east of Lake Tengiz (49°40'–51°00'N, 68°35'–71°15'E). We surveyed the area intensively for breeding colonies, estimated breeding success and characterised habitat use, recording habitat type, cattle presence, vegetation height, distance to water and distance to settlement at the colony sites. We estimated that about 1,500 pairs were breeding in our study area which represents approximately 1% of the species' known breeding range. There is no indication that habitat availability or population density differed significantly in other parts of the species' distribution in Kazakhstan in 2006. Therefore we suggest that the current world population estimate for the Black-winged Pratincole of 10–15,000 pairs (Belik & Lebedeva 2004) is an underestimate. Our results on habitat use quantify general statements for the first time. They suggest that the availability of water and the presence of livestock are important factors in nest site selection.

Belik, V.V. & E.A. Lebedeva (eds.) 2004. International single species action plan for the conservation of the Black-winged Pratincole *Glareola nordmanni*. AEWA Technical series, report no. 4.

Development of breeding plumage in Ruffs *Philomachus pugnax* migrating in spring through southern Belarus

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We studied the development of breeding plumage in 641 male Ruffs during spring migration, 2004–2006, through S Belarus, with special emphasis on the growth rate of ruff and tuft feathers. During northward migration, male Ruffs arriving at our study site at the end of March or beginning of April showed a mixture of winter and striped feathers. The first adults with full breeding plumage were recorded in the last ten days of April and their proportion gradually increased thereafter. However, individuals with at least some traces of winter or striped plumage were caught during the whole study period. Second year birds were less advanced in the development of breeding plumage than adults. Of all 55 second year males trapped, only 20% were in full breeding plumage. There was no significant change in the mean length of the ruffs and tufts of males caught during the main migration period in subsequent years. However, there was a significant, positive correlation between date and the length of the ruff and tuft in both age-classes. During spring migration, the length of the ruff increased by 1.6 mm/day in adults and 1.5 mm/day in second years, whereas the tuft grew 1.1 mm/day in adults and 1.0 mm/day in second years. The growth rates of the ruff and tuft in adults and second years were the same, but during the whole spring migration period adults were more advanced in breeding plumage development than second years.

Sex differences in biometrics of adult Terek Sandpipers *Xenus cinereus* breeding in S Belarus: preliminary results

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Terek Sandpiper is a monomorphic species, but morphometric data of males and females has been based only on museum specimens which are prone to shrinkage. We aimed to provide the biometric characteristics of live Terek Sandpipers of both sexes from the isolated westernmost population breeding in the Pripyat valley, S Belarus (52°04'N, 27°44'E). Terek Sandpipers were caught on the floodplain meadows of the Pripyat river between April and July 2005. A set of standard measurements was taken from each bird and blood samples were taken from 25 for the purposes of molecular sexing. The birds were sexed by DNA analysis, based on amplification of the CHD gene with PCR technique (Griffiths *et al.* 1998). Four more birds were sexed as females by the presence of an egg in the cloaca. In all measurements, females (n = 14) were larger than males (n = 15). For wing, nalospi and tarsus-plus-toe lengths the differences between the sexes were statistically significant (Mann-Whitney U-test: $p < 0.05$); for total head and bill lengths the differences were nearly significant ($p < 0.1$) (note small sample). Tarsus length did not differ significantly between the sexes ($p > 0.1$). The distributions of values of each measurement showed considerable overlap between males and females. Body size factor obtained by the PCA method, which combines wing length and total head length, differed between the sexes (Mann-Whitney U-test: $p < 0.05$), but this would only allow correct sexing of the largest females and the smallest males. Therefore we recommend that the molecular method is the only reliable method of sexing in this species. The results of the molecular sexing of Terek Sandpipers in our study area will be used in future studies of their breeding biology.

The value of the liman and lagoon systems of the southern Ukraine as stopover sites for arctic waders using the Black Sea/Mediterranean flyway

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In southern Ukraine, most migrant sandpipers stopover at the Sivash lagoons despite the existence of what appear to be attractive feeding conditions in nearby 'limans' (limans are narrow, fairly shallow bodies of water near river mouths and are characteristic of parts of the Black and Azov Seas). It appears that this avoidance of limans is connected with differences between the migration strategies of different age groups. Low numbers of sandpipers using limans may arise because they are relatively small and are not suitable for large flocks. However, limans are commonly used by small flocks of young sandpipers during both southward and northward migration. This may be because young birds migrate relatively short distances at a time and limans provide a network of sites with sufficient feeding conditions to support such a strategy.

It is likely that the main reason why most arctic waders choose to stopover on the large lagoons of the Sivash rather than the limans is nothing to do with food resources, which are probably similar, but the large area available for feeding, which allows large flocks to feed together. This probably reduces the risk of predation through greater communal vigilance, especially at times when their ability to fly in impaired during wing moult. The lagoons of the Sivash are wind-flats, i.e. the water is so shallow that almost all wind conditions lead to the exposure of extensive feeding areas. Between them, the Sivash lagoons and the limans of the Black and Azov Seas play a vital role in supporting large numbers of arctic migrant waders.

Nest site fidelity in Black-tailed Godwits

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The Black-tailed Godwit *Limosa limosa limosa* was one of the most common breeding meadowbird species in the Netherlands. The green pastures and meadows of the Dutch lowlands held up to 90% of the breeding population. However, more than 80% of the breeding godwits have disappeared over the last 50 years, and this has led to the upgrading of Black-tailed Godwits to "near-threatened" on the IUCN red list. Changes in agricultural management and the accompanying loss of suitable breeding habitat seem to explain this drastic decline. Black-tailed Godwits show high nest-site faithfulness. The combination of habitat fragmentation and short dispersal distances may be an important, but perhaps rather overlooked factor contributing to the population decline. We studied nest site fidelity in a colour ringed population in The Netherlands. The birds were caught and individually colour ringed as adults on their nests in 2004 and 2005. In 2006, we placed small, battery-powered web-cams at the nest sites to read the colour ring combinations of incubating birds. Here we show how dispersal distance and mate fidelity are related to reproductive success.

Age-independent telomere length as a molecular marker for individual quality in a wader

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Telomeres are dynamic DNA-protein structures that form protective caps at the ends of eukaryotic chromosomes. Although initial telomere length is partly genetically determined, subsequent accelerated telomere shortening has been linked to ageing processes and elevated levels of oxidative stress. Telomeres vary widely in length between individuals of the same age, suggesting that individuals differ in their exposure or response to telomere-shortening stress factors. We examined relative telomere length and its relationship with various fitness components in a population of southern Dunlins *Calidris alpina schinzii* breeding in SW Sweden. In this long-lived species, telomere length does not predict lon-

gevity, as has been found in a more short-lived bird species (Sand Martin). However, we show that relative telomere length correlates negatively with body size (tarsus length) in males, but not in females. This is consistent with previous suggestions that the sexual dimorphism in this and related species of shorebirds has evolved through female mate choice favouring small size in males. In addition, we find that lifetime reproductive success in males, measured in two ways, increases with relative telomere length. Our results therefore imply that individuals with longer than expected telomeres for their age are of higher quality.

Estimation of resources harvestable by mollusc-eating shorebirds wintering on the central Atlantic coast of France

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The mudflats on the coasts of Vendée and Charente are among the most important wintering sites for shorebirds in France. Every year they support around 135,000 individuals of 12 common species. The two main areas are Aiguillon Bay and Marennes-Oléron Bay which are 40 km apart. Aiguillon Bay is located at the junction of the Charente and Vendée coastlines and is surrounded by salt marshes and includes 30 km^2 of intertidal mudflats. Marennes-Oléron Bay is on the Charente coastline just south of Aiguillon Bay. This bay (150 km^2) is enclosed by Oléron Island in the west and the French mainland in the east, with intertidal areas bordering both the island and the mainland coast. These are mainly bare very soft sediments but some places are sandier and covered with seagrass. Four species of bivalves (*Cerastoderma edule, Macoma balthica, Abra tenuis, Scrobicularia plana*) and one species of gastropod (*Hydrobia ulvae*) are common and can be recorded at very high densities. They therefore represent an important food supply for wintering shorebirds between September and March, especially for species like Red Knot *Calidris canutus* and Black-tailed Godwit *Limosa limosa*. In order to estimate the mollusc resources harvestable for birds at both sites, we sampled sediments in mid-winter 2004, 2005 and 2006. Distributions and densities of molluscs were determined by taking cores on four predetermined grids with stations 250 m apart. Each year 308 sampling stations were visited. Molluscs were identified, counted, weighed (ash free dry mass) and energetic content for birds was estimated. In this study we compare mollusc availability for Red Knots and Black-tailed Godwits during the three winters and between subsites and sites. Results on food availability are then compared with the number of individuals wintering at each site in order to explain and predict the distributions of both species on the mudflats.

Advancement of pre-breeding moult in Wood Sandpipers

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The moult into breeding plumage of the Wood Sandpiper *Tringa glareola* on spring migration was studied between 27 April and 18 May, 2005 and 2006, at Kwiecewo (53°57'N, 20°19'E) in NE Poland. Birds caught were aged as second-year (2K) or older than first-year (2+) (not all second-year birds can be separated from adults) and the quantity of new breeding plumage was estimated, in nine % cover classes, for five regions of the upper body. A drop of blood was taken from each bird for molecular sexing based on amplification of the CHD gene with PCR technique (Griffiths *et al*. 1998). The aim of the study was to describe the advancement of moult into breeding plumage at this late stage of their spring migration and determine whether there was any difference between the sexes. Among birds aged as 2+, in both 2005 (n = 79) and 2006 (n = 55), there was almost no differences in the progression of moult between females and males, except for more advanced moult of scapulars in females 2006 (U-test: $p < 0.01$). In both sexes, moult was the most advanced in the scapulars and on the back, where the median coverage by breeding plumage was 21–40% or 41–60%, but in respect of both parts of the body there were some birds that lacked new feathers entirely and others that had almost complete breeding plumage. In the lesser and median coverts in each year, new feathers covered <20% in both sexes, but in 2005 a few males renewed these coverts almost entirely. On the head in both sexes, new feathers covered 21–40% and 0–20% (medians) in 2005 and 2006, respectively, but among each sex there were individuals that had moulted the head completely. Only in head moult was there significant progress with date – in females in 2005 ($Rs = 0.42$, $p < 0.01$, $n = 40$), and in males in 2006 ($Rs = 0.33$, $p < 0.05$, $n = 41$).The lack of clear differences between the sexes in the progress of moult at this late stage of spring migration suggests that in Wood Sandpipers, unlike other waders with greater sexual dimorphism, strategies of energy investment in developing breeding plumage may not differ between males and females.

Between-year variation in the biometrics of male and female Wood Sandpipers *Tringa glareola* during spring migration

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The biometrics of Wood Sandpipers were studied during spring migration (27 April – 17 May) in NE Poland at two sites 50 km apart: in 2002–2003 at Nisko (53°50'N, 20°20'E) and in 2004–2006 at Kwiecewo (53°57'N, 20°19'E). Birds caught were ringed, aged as 2nd year (2K, n = 83) or older than 1st year (2+, n = 316; i.e. not all 2nd year birds could be identified), and standard measurements taken. The birds were sexed by analysis of DNA from blood samples collected in the field, based on amplification of the CHD gene with

PCR technique (Griffiths *et al.*1998). The aim of the study was to study between-year variation in biometrics between males and females. Inter-year variation in biometrics differed substantially between females (n = 149) and males (n = 167) in age 2+. In females, differences between years were well pronounced in the total head and wing lengths (in both – K-W test: $p < 0.01$), but not in tarsus + toe length (K-W test: $p > 0.1$). Conversely, in males inter-seasonal differences (excluding 2004, due to small sample) were the greatest in tarsus + toe length (K-W test: $p < 0.01$), and in total head length (K-W test: $p < 0.05$), but only nearly significant in wing length (K-W test: $p = 0.06$). On average, females had the longest total head length in 2004 and the shortest in 2002; while in males it was longest in 2002. Females had the shortest wing in 2002, but males in 2003. A possible explanation of these inconsistencies could be varied proportions of 2K year birds among 2+ males and females. This is supported by inter-year variation in the proportion of 2K birds among females and males caught (G-test, $p < 0.05$). In 2004, for example, females that could be aged as 2K were only 9% of all females caught, but in 2005 they were 34%.

Habitat use by three wader species in a wintering area of NE Italy: preliminary results

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This study investigates the movements of three wader species in a coastal area of Friuli Venezia Giulia region, NE Italy, during the 2005/06 winter. From December 2005 to April 2006, seven Eurasian Curlews *Numenius arquata*, five Grey Plovers *Pluvialis squatarola* and seven Dunlins *Calidris alpina* were tagged with radio-transmitters and followed on three different days per month, during a complete tidal cycle (high-low-high tide). Also, the monthly distribution of all birds of each species in the main roosts was quantified, and was compared to the distribution obtained from the radio-tracking data. Analysis of these preliminary results suggests that Eurasian Curlews are strongly site-faithful in winter, with 94.7% of fixes close to the catching sites. On the other hand, Grey Plovers and Dunlins were characterised by higher mobility, and were only seldom found near the catching sites (34% and 24.1% respectively). Three tagged individuals (two Dunlins and one Grey Plover) were found in the Venice lagoon (100 km distant) at times when there was a strong decrease of numbers in the study area. There were some other instances where radio-signals were lost and located again only after several weeks. To date, these results suggest that Eurasian Curlews are localized in winter and have low mobility, whereas Grey Plovers and Dunlins tend to move more often and sometimes over considerable distances, exploiting different wintering areas throughout the N Adriatic. The study also demonstrates a strong association ($N = 26$, $r_s = 0.73$, $p < 0.0001$) between the number of Grey Plovers and Dunlins present in a roost, when monitoring on the same day each month and all roosts in sequence.

Revising the breeding population estimate and distribution of the Critically Endangered Sociable Lapwing *Vanellus gregarius*

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The breeding population of Sociable Lapwing *Vanellus gregarius* is believed to be concentrated in Kazakhstan with small populations in south-central Russia. According to published data the population has undergone a significant and rapid decline in the second half of the 20th century. Population size was estimated at not more than 10,000 birds in the early 1990s (Collar *et al.* 1994, Tucker & Heath 1994). A few years later the population had declined to not more than 1,000 breeding pairs (BirdLife International 2001), and recent estimates suggest that the total breeding population is as low as 200–600 breeding pairs (AEWA 2004). Consequently, the species has been recently categorised as Critically Endangered according to the IUCN Red List. However, these population estimates are largely based on anecdote. As part of an intensive autecological research programme on the species we are planning an ambitious survey programme to quantify the true breeding population in at least a major part of the species' range. Here we report on the first phase of revising the breeding population estimate in central Kazakhstan.

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Estimation of the population size of Afro-Siberian Red Knots *Calidris canutus canutus* by colour-ringing

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Individuals of the Afro-Siberian population of the Red Knot were colour-ringed on their main wintering-area, the Banc d'Arguin in Mauritania during midwinter in 2002–2005.

From the numerous resightings of these marked birds in the catching area, the annual survival could be estimated, and with that, the number of marked birds alive. In the main spring-staging area of this population, the Wadden Sea of Schleswig Holstein, the density of these colour-ringed birds was determined around the end of May. Assuming a random dispersion of the colour-ringed birds over the spring staging area, the population-size can be estimated from the ring density and the known number of colour-ringed birds in the population. We estimated the population of adult birds in May 2006 to be around 305,000 (95% CI: 201,000–367,000).

Fattening knots do better in the cold

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In Red Knots *Calidris canutus*, the migratory fattening period is accompanied by hypertrophy of the pectoral muscles in preparation for endurance flight. Because birds in the cold counterbalance heat loss through shivering thermogenesis, we asked the question whether this muscle hypertrophy would confer thermoregulatory side-benefits. We acclimatised Red Knots to different controlled thermal environments and studied within-individual variation in body mass, pectoral muscle size and thermogenic capacity (M_{sum}) throughout a three-month period covering migratory gain and loss of mass. The change in body mass during this period was associated with a change in pectoral muscle thickness and differed among treatments. The change in mass and muscle size affected the change in thermogenic capacity with birds showing the largest increase in body mass and muscle thickness also exhibiting the largest increase in M_{sum}. This led to treatment-specific enhancement in cold endurance. Birds acclimatised to thermoneutral conditions were able to sustain colder temperatures, and this made them indistinguishable from cold-acclimatised birds at the peak of migratory fattening. We conclude that the gain of mass and muscle hypertrophy, in preparation for endurance flight, does confer functional side-benefits in terms of thermogenic capacity, and that this occurs independently of thermal acclimatisation.

Different migration strategies used by two inland wader species

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Waders show a wide range of migration patterns. Piersma (1998) proposed dividing them into two main groups based on migration strategy: one tries to reduce time spent on migration; the other tries to minimize energy expenditure on migration.

This paper analyses the autumn migration strategies of Wood Sandpipers and Common Snipes using the same stopover site and facing similar feeding conditions. The study was carried out at Jeziorsko reservoir, central Poland (51.40°N, 18.40°E) where 3,935 Common Snipes and 4,806 Wood Sandpiper were caught and ringed during autumn in the years 1997–2005. Of these, 129 snipes and 224 Wood Sandpipers were trapped twice during a single season. We recorded: fat load, length of stay, body mass increase and theoretical flight range.

The two species show different patterns. Wood Sandpipers occurred in two peaks (adults and juveniles separately) whereas age-classes of snipe did not show a difference in timing. About a half of the Common Snipes were in active moult and in 2005 >30% of adults were moulting flight feathers. In contrast, only two Wood Sandpipers have ever been caught at Jeziorsko reservoir in flight feather moult and <1% have been found in partial active body moult.

Wood Sandpipers gained weight at an average of 1.15 g/day, snipe at only 0.30 g/day. The species differed significantly in their mean weight (Wood Sandpiper: 66.3 g; Common Snipe: 102.0 g, $p < 0.001$). To control for this difference, mass changes were converted into % lean body mass (LBM) gained per day. The relationship between mass change and stopover duration (days) was estimated for both species: Common Snipe mass change = 0.296 * stopover duration – 0.338 ($R^2 = 11\%$, $p < 0.001$) Wood Sandpiper mass change = 2.103 * stopover duration + 1.114 ($R^2 = 33\%$, $p < 0.001$)

The average % LBM gained per day (the coefficients in the equations) was significantly higher for Wood Sandpiper than for Common Snipe ($t = 8.40$, $p < 0.001$). The maximum observed weight gain was also higher for Wood Sandpiper (5.67 g/day or 10.4% LBM/day) than for Common Snipe (3.66 g/day or 3.76% LBM/day).

Data from retraps was used to evaluate differences in stopover duration. The median period between captures differed significantly between species: five days for Wood Sandpiper and eleven days for Common Snipe. The maximum recorded periods were 31 and 42 days respectively.

Common Snipes had significantly smaller fuel loads (4% of LBM) than Wood Sandpipers (21% of LBM; $p < 0.001$). Similarly maximum fuel loads were 54% and 81% respectively. Therefore Wood Sandpipers, having more fat reserves, had a greater potential flight range (estimated at 2,925–3,512 km) than Common Snipes (1,884–2,919 km).

In summary, Wood Sandpipers at Jeziorsko appear to minimise time spent on migration whereas Common Snipes minimise energy expenditure.

Time budgets of Northern Lapwing chicks during the first days after hatching

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This study was carried out between the end of April and the end of June 2006 in the seasonally-flooded valley of the Pripyat' river near Turov, S Belarus (52°04'N, 27°44'E). We investigated the time budget of lapwing chicks by direct observations from a hide, three times daily for three hours. To minimize disturbance to the chicks, the distance between the hide and the focal birds was at least 10 m. All types of behaviour by the chicks were recorded and analyzed. We calculated mean percentage time spent on each behaviour. The first days of the chicks' life appeared to be their most important period due to the slow development of thermoregulation. During the first four days, the chicks were brooded, mainly by the female, for 32–48% of the time. In this period, foraging comprised 10–15% of their time budget. As the chicks grew older, brooding bouts decreased to 17% and foraging bouts increased to 78%. The proportions of time spent brooding and foraging depended on the age of the chicks and ambient temperature. In adverse weather conditions, small chicks may need so much brooding that they have little time to feed.