

them all would require way too much space. But let me add just one more thing. For us Hungarian participants, it was an exceptionally great honour to see people familiar from the last WSG Conference held in Hungary. By their presence, these people indicated to us that they had had a good experience and nice memories of the last time they attended a Wader Study Group Conference in Hungary. I believe that the sight of Lake Balaton with the morning light gently sweeping through the mist and the many enjoyable and useful moments of the conference itself will leave similarly pleasing impression of the 1998 Wader Study Group Conference in both first-timers as well as long-time traditional participants.

Szabolcs Lengyel, Department of Evolutionary Zoology and Human Biology, Kossuth University, 4032 Debrecen, Egyetem tér 1., Hungary

1998 WSG MEETING: ABSTRACTS OF TALKS AND POSTERS

Current state of the International Breeding Condition Survey on Arctic Birds

*M. Y. Soloviev & P. S. Tomkovich
Dept. of Vertebrate Zoology & General Ecology, Biological Faculty, Moscow State University, 119899 Moscow, Russia*

This report summarises progress achieved in the period from September 1997 - May 1998 in realisation of a joint International Wader Study Group/ Wetlands International project aimed at collating in a database information on environmental conditions on the breeding areas of arctic nesting waterfowl. Main efforts during this phase were aimed at completing the pilot stage and preparing to realise the project's full-scale implementation after the 1998 field season. This involved: 1. developing the database structure (data model); 2. starting entry of existing data; and 3. revising the questionnaires on the basis of comments provided on the pilot

sheet. The database currently includes sections with 1. personal respondents' data; 2. study location data (linked to GIS); 3. general breeding conditions information and weather data; 4. data on abundance and breeding performance of individual bird species and animal groups; and 5. bibliographic data. Revision of the questionnaire most affected the sections describing the survey site and fauna in the study area (including breeding performance), which became more detailed. As few of the environmental factors of interest in the Arctic were discovered to be specific to waterfowl and of little value for other groups of terrestrial birds, to avoid unnecessary narrowing of the project scope its title has been changed to "**ARCTIC BIRDS: an international breeding conditions survey**". Future actions on the project will include collecting forms in autumn 1998 with a view to printing a newsletter early in 1999 and publishing a review of bird breeding conditions in the Arctic in 1998.

Present status of breeding populations of Dunlin *Calidris alpina schinzii* in Poland

*A. Włodarczak
Waterbird Research Group KULING, Dept. of Vertebrate Ecology & Zoology, Univ. of Gdańsk, al. Legionów 9, 80-441, Gdańsk, Poland*

This century, the numbers of breeding sites and the breeding population of Dunlin have been decreasing steadily along the Baltic coast. Twenty years ago, about 80-100 pairs nested on six coastal and two inland breeding sites. In 1997, the Polish population of Dunlin consist of 32-34 breeding pairs, which were found on one inland and four coastal localities. Half of them (12 pairs) nested near the mouth of the Reda river (Puck Bay). Ten pairs were recorded at three sites within the delta of Swina river (Szczecin Lagoon). The rest of the breeding sites were occupied by single pairs.

The evolution of parental care in shorebirds: sex differences in mating opportunities

*J. Kis¹, T. Székely & I. C. Cuthill
¹ Behavioural Biology Research Group, Dept. Ecology, Univ. Vet. Sci., H-1400 Budapest, PO Box 2, Hungary*

Models of parental care predict sex differences in the benefits of offspring desertion arising from remating and re-nesting. We investigated this proposition in the Kentish Plover *Charadrius alexandrinus* which exhibits highly variable patterns of parental care, as either the male or female parent may desert their brood. Female plovers desert their broods more often than males. We investigated whether sex differences in mating opportunities may explain why females desert their broods more frequently than males. This hypothesis was experimentally tested in the field by randomly removing one of the pair from 30 different pairs, and observing the behaviour of the remaining birds. Both males and females appeared to search for new mates. Single males often stayed in their territory, courted females which landed there, and if their courtship was successful then they bred in their previous territory. Single females often moved to new territories to breed. Single males took more time to find a new mate (median=25.4 days) than single females (median=5.3 days, $p < 0.0001$). In both sexes, remating time tended to increase as the breeding season progressed. Hatching success of new nests did not differ between males and females. These results support the hypothesis that the relative benefit of desertion, i.e. remating, may differ for males and females.

Declines in breeding waders on lowland wet grasslands in Cumbria (NW England) 1982-1995

*F. Mawby
Wayside, Kirkbride, Carlisle, Cumbria CA5 5JR, UK*



The British Trust for Ornithology, in cooperation with RSPB and the Nature Conservancy Council (Smith 1983) made surveys of lowland breeding waders in 1982. During 1995, the Wader Group of the Cumbria Bird Club repeated the surveys to detect any population changes. Significant declines were found in breeding populations of Lapwing (-38%), Redshank (-25.8%), and Snipe (-62.5%). Oystercatcher numbers continued their increase (+67%). Curlew numbers were lower than in 1982 (-10.0%); however, this change was not statistically significant. Possible reasons for population changes are discussed.

Is the Ringed Plover *Charadrius hiaticula* going extinct in Central Europe?

P. Chylarecki

Gdańsk Ornithological Station, Inst. Ecology, Polish Academy of Sciences, Nadwislanska 108, PL-80-680 Gdańsk 40, Poland

The growth of a Ringed Plover population was modelled using a stochastic matrix population model, and demographic data collected during a six-year study at Bug River, east Poland. Demographic parameters were allowed to vary stochastically within the limits found in the study population. As expected for a long-lived bird, population trends were most sensitive to adult survival. However, simulations revealed that population size is also quite sensitive to changes in nest success. Whether or not annual survival of first-year birds varies in parallel with that of adults was another important issue. Generally, if long-term average nest success was lower than ca. 50%, the population decreased rather rapidly and went extinct in 70-200 years. Actual nest success in the study population averaged 46%, yielding an extinction time of ca. 80 years. Habitat loss, not included in the model, will further worsen matters.

These results may apply to other wader populations breeding in temperate Europe and showing demographics comparable with those of the Ringed Plover population studied. Many wader populations are now in decline and require conservation measures, but our ability to affect their important demographic parameters (such as adult survival or propensity to lay a second clutch) is limited. Thus, breeding success, particularly nest success, often remains the only important factor available for management efforts. Possible conservation measures should aim not only to change land use practices, but also to reduce heavy nest predation. Precise survival estimates for both adult and young (first year) birds, as well as knowledge of their temporal variation, are badly needed to construct demographic models that enable a reliable assessment of population viability in waders.

European Union Action Plans for species of unfavourable conservation status: Jack Snipe *Lymnocyptes minimus*, Curlew *Numenius arquata*, Redshank *Tringa totanus* and Black-tailed Godwit *Limosa limosa*, an update since last year

T. Fox

National Environmental Research Institute KALO, Grenavej 12, DK-8410 Ronde, Denmark

In 1996, the European Commission (DGXI) initiated a review of the status, distribution and abundance of migratory birds species which are presently listed under Annex II of the Council Directive 79/409/EEC (the Birds Directive). These species are subject to hunting in various Member States within the EU, yet most are showing signs of population decline. The review flagged up a number of wader species in this category, and in 1997 the European Commission part funded the Danish National Environmental Research Institute to develop species action plans for the four species: Jack Snipe, Curlew, Redshank and Black-tailed Godwit. An

outline of the first two sections of the plans for these four species have been completed, namely Part 1, comprising the biological descriptions and Part 2, establishing the objectives of the plans, based upon an evaluation of the available information. These outlines will now go out for consultation with the Member States, via NGOs, government agencies and experts, and it is to be hoped that knowledge accumulated under the Breeding Waders in Europe 2000 project will feed directly into this process. It is hoped to further develop and up-grade the planning process by discussions to be held at the WSG meeting at Keszthely in Hungary.

Mount Pinatubo and the breeding biology of arctic waterbirds

B. Ganter

WWF, Schlossgang 18, 25813, Husum, Germany

On June 15th 1991, the volcano Mount Pinatubo erupted on the Philippines. The cloud of debris resulting from the eruption reached the northern hemisphere several months later and, as a result of reduced solar radiation, the temperatures in almost the entire Arctic in the summer of 1992 were 1-2 °C lower than normal. This had dramatic consequences for arctic breeding birds. Although periodic breeding failures in parts of the Arctic are far from unusual, a breeding failure encompassing almost the entire Arctic in the same year is exceptional. To clarify in what ways the circumpolar bad weather influenced the breeding season of arctic birds in 1992, I compiled data on breeding biology of arctic waterfowl and waders from more than 30 field studies, and I summarise the results here.

In comparison with other years, most projects reported a higher proportion of non-breeders and delayed onset of nest initiation. Hatching and fledging success of the low number of late breeders was greatly reduced. In addition, some projects reported lower clutch sizes and increased adult



mortality. Exceptions from the general pattern of failure were Svalbard and northern Scandinavia, where temperatures were normal and the breeding season progressed as usual. In the Russian arctic, a lemming low and predator high presented severe additional problems for breeding birds even in those areas where the reduction in temperature was less pronounced. In total, there was an almost-complete reproductive failure for waders and waterfowl in the entire Arctic in 1992; this must have had a short-term effect on global waterbird populations.

Low weight increase during spring migration in European Bar-tailed Godwits *Limosa lapponica*: food-limited or energy-minimised migration?

G. Scheiffarth

Institut für Vogelforschung, An der Vogelwarte 21, D-26386 Wilhelmshaven, Germany

Bar-tailed Godwits of the European population migrate in spring from their wintering areas in Great Britain and The Netherlands through the northern Wadden Sea to their European breeding areas. During stop-over in the northern part of the Wadden Sea, they increase in weight by 1.5 g per day. This rate is rather low from a theoretical point of view as well as in comparison with long-distance migrating birds from the Afro-Siberian population - a greater weight increase should be possible. Birds seem not to be constrained by a) overall energy turn-over, since energy expenditure for maintenance metabolism, heating of food, moult, and fuel deposition reached only 2.8% BMR, nor by b) food intake, since intake rates increase in spring as compared to autumn and winter with a parallel decrease in foraging time. It is hypothesised that the low fuel deposition rate is the consequence of an energy-minimised migration strategy and that the migratory season is not the period with highest energy demands in the annual cycle of this population.

Trends in the numbers of Golden Plovers *Pluvialis apricaria* and Lapwing *Vanellus vanellus* in Britain

S. Gillings

British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK

Trend indices from coastal Wetland Bird Survey (WeBS) count data are presented for Golden Plover *Pluvialis apricaria* and Lapwing *Vanellus vanellus* wintering in Britain. National coastal indices for both species show a two-fold increase between 1970 and 1996. Analysis of indices by region show that the increases have mainly taken place on the east coast of Britain. Possible explanations for these increases are discussed, including actual population increase, redistribution and methodological artefact. Future research requirements are highlighted.

Spring migration of Sanderlings *Calidris alba* through the Wadden Sea of Schleswig-Holstein, Germany.

A. Diederichs & K. Günther

WWF, Projektbüro Wattenmeer, Nordestr. 3, D-25813 Husum, Germany

The spring migration of Sanderlings through the Schleswig-Holstein Wadden Sea was studied in 1997-1998. To characterise spatial and temporal distribution patterns of the species' presence, counts since 1981 are analysed. In one of the main staging areas at Westerhever Sand, more frequent and more detailed counts in 1997 and 1998 show a habitat-dependent distribution pattern.

Maximum numbers were reached during the last week of May. The main staging areas for Sanderlings are the island of Trischen, the sandbanks of Sankt-Peter-Ording and Westerhever and some remote sandbanks. The most favoured feeding habitats in March and April are sandy shores. In the second half of May the Sanderlings change their main feeding habitat from the shoreline to the

tidal sandflats. This change correlates with the suddenly increasing number of *Corophium arenarius* in the sandflats.

Information about site fidelity, turnover rates and origin of Sanderlings was collected by catching and ringing the birds with individual colour-rings. Foreign recoveries and sightings show movements to Helgoland (1), England (>4), Portugal (1) and Ghana (>3) and many local sightings reveal a high site tenacity towards their staging area within and between years. Very few birds were observed at sites more than 10 km away from the ringing-site. Our data suggest that there is no strong turnover of individuals. Many Sanderlings stop for at least 2-3 weeks. The maximum staging time measured was 52 days. The average weight increased from less than 50 g at the end of April up to 90-100 g at the end of May before departure for the breeding grounds. All departing Sanderlings observed were flying in a north-north-west-direction.

Changes in numbers of waders in the German Wadden Sea since 1987

K. Günther

WWF, Projektbüro Wattenmeer, Nordestr. 3, D-25813 Husum, Germany

Since 1987, waders and other waterbirds have been monitored in the Wadden Sea of Schleswig-Holstein by performing spring-tide counts every 15 days throughout each year at a selection of important high-tide roosts. These counts are used for calculating bird-days and population trends. Trends are analysed for spring, autumn and winter for 20 wader species. Winter trends fluctuate considerably and generally reflect the severity of the winter, while spring and autumn trends are used to determine changes in population sizes. Seven species (Oystercatcher, Avocet, Grey Plover, Knot, Black-tailed Godwit and Redshank) are decreasing, ten species (Kentish Plover, Sanderling, Dunlin, Ruff, Bar-tailed Godwit, Whimbrel, Curlew, Spotted Redshank, Greenshank,



Turnstone) show constant or fluctuating numbers and only three species are slightly increasing in numbers (Ringed Plover, Lapwing, Common Sandpiper).

Autumn migration of Wood Sandpiper *Tringa glareola* in the region of the Gulf of Gdansk

W. Meissner

Waterbird Research Group KULING, Dept. of Vertebrate Ecology & Zoology, Univ. of Gdańsk, al. Legionów 9, 80-441, Gdańsk, Poland

The study was conducted between 1983 and 1994 at two sites: near Jastarnia at the Hel Peninsula and in the region of the river Reda mouth. Birds were caught in walk-in traps, ringed and measured and regular counts were also conducted. Altogether 36 adult and 765 young Wood Sandpipers were measured. Nineteen long-term recoveries obtained until 1996 were used to show the direction of migration. Only three recoveries refer to birds ringed at an earlier stage of autumn migration than the Gulf of Gdansk. All of them come from Finland. After crossing the Gulf of Gdansk, Wood Sandpipers continue their passage in directions varying between south-east and south-west. The mean pattern of migration dynamics for the Gulf of Gdansk is similar to those reported from many places situated in central and western as well as southern Europe.

Juvenile Wood Sandpipers passing the Gulf of Gdansk region significantly differ in biometrics in subsequent seasons, but not in subsequent five-day periods (two-way ANOVA). The largest mean measurements were found in 1985 and 1986 when the numbers of this species were also highest. Spearman rank correlation coefficients for the relationship between the total number of observed birds and the mean bill and wing lengths are very high (1.0 and 0.8 respectively). This suggests that in years of high breeding success young birds also reach a significantly larger size.

The present status of the Wader Database

L. Haanstra

IBN-DLO, PO Box 23, NL6700 AA, Wageningen, The Netherlands

The Wetlands International Wader Database is part of the International Waterbird Census, and is managed by IBN-DLO, the Dutch institute for nature research on behalf of Wetlands International. Since September 1997 the wader database has been under major reconstruction. Two of the most important premises for the redevelopment were that a) it needed to be rebuilt from scratch, using the IWC database structure and using dBase IV as software in the first phase; and b) that all wader species from Africa, Europe and the Middle East should be included. The database has a number of linked data files, of which the count file, the site file and the species file are the most important. By 1 October 1998 there were data from 7,249 sites from 85 countries and for 95 species of wader. In total 76,845 records are included in the count file. Most of the data are from 1990 up to 1997. About 80% of the data is from the IWC midwinter counts.

Priorities for 1999 are: importing old data from the old database, supported by material compiled by Cor Smit (IBN-DLO, the previous database coordinator); changing to more modern software; revising the habitat recording and chasing data collected according to a new description method and extending the counts outside the midwinter period. The database is now able to generate population trends and population size estimates for European populations, so supporting the implementation of flyway agreements and the selection of international important sites for waders.

The Curlew Sandpiper Workshop in Cape Town, South Africa

L. Underhill

Avian Demography Unit, University of Cape Town, Rondebosch, 7701, South Africa

Under the auspices of the International Wader Study Group (IWSG), a Curlew Sandpiper Workshop was held in Cape Town, South Africa, in August 1998. The results of this workshop are summarised. It is proposed to produce an issue of International Wader Studies, devoted to the Curlew Sandpiper and an informal working group will be formed to do this.

Editor's note: Abstracts from this workshop appeared in the Bulletin 87 (December 1998).

Carrying capacity - is there any evidence of it having been reached for Grey Plovers *Pluvialis squatarola* on U.K. estuaries?

M. Rehfish¹ & G. Austin¹

¹ British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK

In 1999, the idea that, if a population keeps increasing, sooner or later the birds in an area will be brought to some carrying capacity will have been around for thirty years. Fretwell & Lucas furthered this idea by suggesting that animals would fill the best habitats first. As yet, there have been relatively few concrete demonstrations of this hypothesis with its obvious conservation ramifications. For example, it might be considered important to give preferred sites a higher conservation status than less preferred sites and yet the 1% criterion only takes quantity of birds, not quality of site into consideration. A preferred, but small, site may fail to reach the 1% criterion as national numbers increase and more and more birds are forced onto less preferred sites. If these preferred sites are then afforded less protection, there is a danger of losing the very sites which would be most important should the national population decline.

Grey Plovers are an ideal study species to test the Fretwell & Lucas hypothesis as their numbers have increased by 700% in the UK since the beginning of nationwide WeBS monitoring and, if Fretwell & Lucas were correct, it would



be expected that, by now, preferred estuaries would show signs of filling. An initial analysis by Moser (1988) claimed that by the 1985-86 winter, when the national WeBS index for Grey Plover numbers had only tripled, numbers of Grey Plovers were starting to plateau in some estuaries. This study repeats the original analyses in an attempt to determine which estuaries may have become full, and discusses the results and carrying capacity more generally in terms of their possible conservation implications.

Relationship between the number of staging Dunlins *Calidris alpina* and the abundance of their benthic prey: the effect of severe winters

M. Desholm

Dept. of Marine Ecology, Institute of Biological Sciences, University of Aarhus, Finlandsgade 14, 8200 Aarhus N, Denmark

Data from ten years of weather recordings and from the wader and infaunal invertebrate monitoring at Tipperne, Denmark, were analysed. Additionally, an infaunal sampling program was carried out between April and November 1996 after an extremely severe winter. These data were used to examine (1) the relationship between the presence of staging Dunlins *Calidris alpina* during spring and autumn migration and prey availability; and (2) the influence of severe winters on this relationship.

A significant positive correlation was found in springs between the mean winter temperature and the density of infaunal invertebrates. Additionally, a significant positive correlation was found between invertebrate density and the abundance of staging Dunlins during spring. In contrast, no such significant relationship was found during autumn where the abundance of prey organisms was generally higher than during spring time. The 1996 data showed that even after severe winters with low spring prey densities, the invertebrates were

effectively recolonizing the mudflats, thus obtaining high 'non-severe winter' densities at the end of the year.

It is concluded that severe winters cause low prey densities during spring, resulting in a tight relationship between the Dunlins and their benthic prey. In contrast, their effective recolonization abilities enable the invertebrates to reach densities well above the threshold level where additional prey densities have no influence on the number of staging birds. Even though the invertebrate fauna at Tipperne appears to be unstable and weak it does persist through time and can be characterised as a reliable food for Dunlins during autumn migration, but not necessarily during spring.

How do individual differences influence habitat and diet choice in Knots *Calidris canutus*?

S. Nebel

Netherlands Institute for Sea Research (NIOZ), PO Box 59, 1790 AB Den Burg, Texel, The Netherlands

Two subspecies of Knots *Calidris canutus* use the Wadden Sea every year as a stop-over site during migration or as an overwintering site. They mainly eat hard-shelled bivalves which they swallow whole and crack with their muscular stomach. The size of the internal organs changes as an adjustment to long distance flight, e.g. stomach size can decrease to 50% of the original weight. In the summer of 1997, 28 Knots were caught in the Dutch Wadden Sea and marked with radio-transmitters. The stomach size of the living birds was measured with a portable echoscope. The droppings of flocks with marked individuals were collected and analysed. There are strong indications that there is a positive correlation between the size of the stomach and the amount of hard-shelled prey items in the droppings. This would imply that the physiological requirements of long-distance migration affect diet choice and may impair

maximal intake rates. As a consequence, the two subspecies may feed on different types of prey.

Impact of macroalgae blooms and wader predation on estuaries macroinvertebrates - experimental evidence

R. J. Lopes, M. A. Pardal & J. C. Marques

Institute of Marine Research (IMAR), Dept. of Zoology, University of Coimbra, 3000 Coimbra, Portugal

In the Mondego estuary, west Portugal, the occurrence of seasonal macroalgae blooms (mainly *Enteromorpha* spp.) during the spring can affect the macroinvertebrate population. Also the impact of wader predation can be of different magnitudes in the presence or absence of algae. Using an experimental design, the impact of wader predation and macroalgae mats on intertidal macroinvertebrates was tested during spring 1997. Theoretically, within this period, two factors should have the greatest impact, since it is the period of the year when the macroalgae biomass is greater than 100 g AFDW and corresponds to the wader spring migration.

The experiment was performed on a homogenous intertidal mudflat with no initial algae cover and reduced elevation. In March, four treatments were allocated to 2x2 m plots (algae and predation; algae and no predation; no algae and predation; no algae no predation). Each treatment was replicated five times and the plots were disposed in a 5x4 matrix. The treatments were interspersed within each line of four plots. Wader exclosures were made with a mesh supported 50 cm above the sediment surface and by connecting corner stakes with horizontal strings of plastic tape. This method was used to minimise the formation of artefacts and posterior scouring and siltation, and preventing the predation by birds without affecting the other secondary predators. Green algae (300 g AFDW) were added to the



plots to simulate the effect of algal mats. Sampling of macroinvertebrates was carried out in April and May and data from the most abundant wader prey species was selected. The total density available for waders and stratification of the individuals between the two strata were analysed with ANOVA and model analysis carried out for differences in size frequencies.

For the species *Scrobicularia plana*, the impact of algae cover on total densities was significant only after two months (May). Wader predation did not have a significant impact on total densities or biomass of macrovertebrates. However, the association of algae mats and wader predation decreased significantly the total density and biomass of *Hydrobia ulvae*. The percentage of prey and biomass available for waders decreased significantly with the presence of algae for *S. plana* and *H. ulvae* and also with wader predation in the case of *S. plana*.

The effect of weather on time budgets, growth and energetics of Avocet *Recurvirostra avosetta*

R. Joest & H. Hötter

FTZ University of Kiel, Krenzberger Strasse 7/42, 33619 Bielefeld, Germany

A population study of Avocets in the North Frisian Wadden Sea close to the northern limit of the species' range has revealed that the chick survival rate in the population was mainly determined by weather conditions. We investigated how weather affected the energy expenditure of the chicks. We measured daily energy expenditure (DEE) by using doubly labelled water in experiments with 29 free-ranging Avocet chicks. In addition, time budgets, food intake and growth rates of the chicks were recorded. The results showed that time budgets and DEE were influenced by the body mass of the chicks. Effects of weather on time budgets, food intake and growth rate could only be found for chicks with body masses below 50g, i.e. not yet fully homiothermic chicks. DEE was not significantly influenced by

weather parameters but tended to decrease in situations with low temperatures, low solar radiation, high wind speeds and high amounts of rain. Chicks avoided high thermoregulatory costs by being brooded by their parents. Extensive brooding left little time for foraging, so that the chicks had a slower rate of food intake and a reduced growth rate.

Mate choice in Lapwing *Vanellus vanellus*: the significance of song-flight behaviour

A. Liker¹ & T. Székely

¹ Behavioural Biology Research Group, Dept. of Ecology, University of Veterinary Science, H-1400 Budapest, PO Box 2, Hungary

The aim of this study was to investigate the behaviour and ecology of male Northern Lapwings which may influence their mating success. Display behaviour and territory size were observed for 17 males in 1994. Six out of 17 males attracted two females (polygamy), nine males attracted one female (monogamy), whereas two males remained unmated. Territory size and food abundance on male territories were unrelated to the mating pattern of males. However, males which became polygynous spent more time on acrobatic aerial displays ('song-flight', 7.5 ± 1.6 (S.E.) % of time) than those males which remained monogamous (1.6 ± 0.7 % of time). Time spent on ground displays did not differ between polygynous and monogamous males. These results suggest that time spent on song-flight influences male mating success, either by female choice or by male-male competition. We argue that polygamy was not forced on females by the lack of unmated territorial males; rather some females preferred already mated males to unmated ones and nested in the territories of mated males.

Comparative day & night feeding behaviour and intake rates in mussel-feeding Oystercatcher *Haematopus ostralegus*

H. Sitters

Limosa, Old Ebford Lane, Ebford, Exeter EX3 0QR, UK.

Using a camcorder by day and infra-red video at night, the foraging behaviour of mussel-feeding Oystercatcher was studied on the Exe estuary, SW England. Ventral hammerers located mussels mainly by sight by day but by touch at night; handling times were longer at night leading to a lower rate of mussel consumption. However, larger mussels were taken at night so there was no significant difference in intake rates between day and night. Stabbers also changed from sight-location by day to touch-location at night. Night intake rate increased from August to January because searching time at night declined. During August-October, day intake rate was higher than night but, during November-January, night intake rate was higher than day. The decline in searching time at night probably arises from changes in the feeding behaviour of mussels. Dorsal hammerers only located mussels by sight, both day and night. Searching times and intake rates were higher on moonlit nights than on dark nights. Intake rates on bright nights were the same as by day but 40% lower on dark nights. By day, but not at night, dorsal hammerers opened 25-30% of mussels by stabbing. The incidence of aggressive intraspecific encounters was much lower by night than by day.

Incubation behaviour of Kentish plover *Charadrius alexandrius*

A. Kosztolányi & T. Székely

Behavioural Ecology Research Group, Dept. of Evolutionary Zoology and Human Biology, Kossuth University, H-4010 Debrecen, Egyetem tér 1., Hungary

We investigated the incubation behaviour of Kentish Plover in Southern



Turkey in 1997 and 1998. We developed an automatic recording system ('transponder system') to record the incubation schedules of parents over 24 hours. Each parent was fitted with a small chip ('a transponder') and detector under the nest identified the parent and sent the readout to the datalogger. The system was considered accurate, since false readings occurred only 0.2 % of the time. Using a combination of readings from the transponder system and behavioural observations system, we investigated whether the incubation behaviour of male and female plovers differed. We found that females incubated mostly during the day, whereas males most often incubated at night. We also found that incubation bouts of females tended to be longer in the daytime than that of males.

POSTERS

Can waders meet their energetic requirements without the use of salinas in a south-west European estuary?

*R.J. Lopes, T. Murias & J.C. Marques
Institute of Marine Research (IMAR),
Dept. of Zoology, University of
Coimbra, 3000 Coimbra, Portugal.*

In the Mondego estuary, west Portugal, two different feeding habitats, intertidal mudflats and salinas, are used by waders during the winter and migration periods. The salinas are either being transformed into fish-farms or just abandoned. Indirect studies suggest that the salinas are mostly used as an alternative feeding habitat during the hours of high tide. Therefore the current loss of salinas could increase the pressure on mudflats, which are only available for short period of time. However, to test if the majority of waders can fulfil their energetic needs we must compare their real consumption with the theoretical rates for each species. This was done for the principal wader species in the estuary in winter and on spring migration. Data obtained by direct observation of

diet and energy intake were used to determine actual energy intake rates. The theoretical rates of energetic demand were determined using allometric equations relating basal metabolic rates and field metabolic rates with wader biomass. A detailed wader census scheme was performed fortnightly in order to get precise data on the total amount of waders in the estuary. The analysis of the data suggests that the mudflats will still be able to maintain the total wader population if the loss of salinas continue. Nevertheless, other factors, such as competition, must be considered in order to establish the carrying capacity of the intertidal mudflats. Considerations about the existence of nocturnal feeding based on observations and ringing experience are examined.

Wader population phenology and ecology at the sodic lakes of Kiskunság

*E. Boros
Kiskunság National Park, H-6000
Kecskemét, Liszt F. u. 19, Hungary*

After water regulation and reclamation, very few sodic lakes remain on the Great Hungarian Plain. One of the existing natural sodic lake systems is the "Kiskunság" system in the Danube Valley. Because of their ecological importance these sodic lakes (Lake Kelemen, Lake Fehér, Lake Zab, Lake Pipás, and Lake Kis) have been protected since 1975 as the Kiskunság National Park and Biosphere Reserve. In addition, all sodic lakes in Hungary having been protected by law since 1997. Due to the special ecological characteristics of these lakes, which are like European coastal ecosystems, these lakes are important breeding and migration places for the waders in Hungary so the "Kiskunság" sodic lakes are listed as a Ramsar site.

The population phenology and ecology of ten of the most abundant breeding and migrating wader species from the six existing sodic lakes of "Kiskunság"

was studied between 1986 and 1997. The wader populations have been counted by the staff of Hungarian Ornithological Society and special ecological investigations were carried out by the research workers and staff of Kiskunság National Park Authority. Various ecological features were correlated with changes in the wader populations.

Impressions on wintering waders of the Red Sea coast near Massawa and the Dahlak Archipelago (Eritrea)

*N. Baccetti¹, A. De Faveri & A. Magnani
Istituto Nazionale per la Fauna
Selvatica, via Cá Fornacetta 9, 40064
Ozzano Emilia, Italy*

Our holiday in February 1998 gave us the opportunity to see and count waders on some beaches, salinas and islands of Eritrea, a country where almost no quantitative information on birds is so far available. Point counts at low tide allowed us to speculate on possible totals over a large area. Some high-tide roosts were discovered, although none of them was really remarkable in size. Oil extraction is presently under implementation in the Gulf of Zula, where the largest wader numbers are probably present.

Age, nest conservatism and pair consistency of Kentish Plover *Charadrius alexandrinus*

*A. Korzyukov
Dept. of Biology, Odessa State
University, 270058 Odessa 58,
Shampansky per. 2, Ukraine.*

More than 2,500 Kentish Plover have been ringed since 1975 in the north-west Black Sea region by the ornithologists of the Odessa State University. Most of those ringed were adult. Birds were captured during the breeding season near their nests. More than 60 Kentish Plovers were captured again at least one year after ringing. One female was



captured eleven years after ringing 50 km from where she was first captured. Very often we had recoveries after five or more years. We had two recoveries of one bird which had been ringed in 1986. The first recovery was in 1990, when it was captured 110 km from its first capture site. The second recovery was in 1994, when it was captured 50 km from its first capture site. Most Kentish Plover come back to breed in the same region each year. Nevertheless, they can move up to 30-60 km in response to the prevailing water conditions.

Kentish Plovers re-nest when the first clutch is destroyed. The new nest can be built up to 50 km from the first one. For example, when we ringed both partners of a pair near their nest and this nest was destroyed, some days later we captured the same pair near a nest with three eggs 50 km from the first one. Thus, we assume that Kentish Plover colonies can move up to one hundred kilometres. Kentish Plover can create pair-bonds for two and more years.

Development of the project 'Tringa glareola 2000'

M. Remisiewicz & M. Sciborski
Waterbird Research Group KULING,
Dept. of Vertebrate Ecology & Zoology,
Univ. of Gdańsk, al. Legionów 9, 80-441, Gdańsk, Poland

In 1997, the research program 'Tringa glareola 2000' was started by the Waterbird Research Group KULING as a Wader Study Group project. It is focusing on the migration of this species throughout Europe, with special attention paid to migration flyways, migration phenology and dynamics and resting sites. The methods used are colour ringing, dyeing, regular counts and observations. The project gained interest from many ornithologists all over the Europe and also outside it. After two years of the activity of the programme, about 25 groups/people from 15 countries (ten in Europe and five in Africa and Asia) are taking part in the programme. Twelve ringing

stations work within the project, two further will be organised in 1998 and counts at over 20 sites have been conducted or have material available from the previous season.

Wood Sandpipers were colour-ringed in 1997 in Poland, Hungary, Italy and Finland (where they were also dyed in autumn). Four hundred Wood Sandpipers were colour ringed and 37 dyed in 1997. In spring 1998, about 70 Wood Sandpipers were colour-ringed in Poland. The results of colour ringing are very interesting. Out of 320 birds with colour rings put on in autumn 1997 in Reda mouth (Gulf of Gdańsk, Poland), five records of Wood Sandpipers have already been obtained. Two of the records are direct recoveries - one after ca. two weeks in Hungary and the second - not more than five days after ringing - in northern Italy. Three further records come from May 1998, from the regions of Göttingen and Hannover (Germany). These results suggest that birds migrating in August through the Gulf of Gdańsk return from wintering grounds through central Germany. One Wood Sandpiper ringed in mid-May in southern Italy and observed after ca. 11 days in Finland backs-up the results from recoveries of metal-ringed birds. The recovery rate of colour-ringed Wood Sandpipers migrating through the Gulf of Gdańsk, is double that for metal rings, despite it only having been one year since colour-ringing started. These results substantially support the existing knowledge about the migration pattern of these populations of Wood Sandpiper. By comparing it with pooled data from many years study of migration in this region we can make conclusions regarding the migration routes of different waves of Wood Sandpiper and the correspondence of waves occurring in autumn and in spring.

On 22nd November 1998, the international Workshop on Project 'Tringa glareola 2000' will be held in Gdańsk, Poland. The programme includes: presentation of earlier studies on the species in different countries,

summing up of the results of the project and discussions on common methods of study. The participation of the majority of Central European countries has been approved. Persons interested in the project and in the workshop are welcome to contact WRG KULING.

Status, population dynamics and patterns of habitat selection of Avocets *Recurvirostra avoetia* in Cadiz Bay (SW Spain): implications for conservation

G. M. Arroyo¹, J. A. Masero, F. Hortas & M. Castro

¹ Dept. of Animal Biology & Ecology,
University of Cadiz, PO Box 40, 11510
Puerto Real, Cadiz, Portugal

Changes in coastal wetlands in Cadiz Bay, mainly transformation and abandonment of salinas, seem to have affected wader populations in general, and particularly Avocet populations. In this work we discuss general patterns of temporal and spatial use of Avocets in different supratidal habitats in Cadiz Bay, as well as changes in wintering and breeding population, in relation to habitat changes. We discuss also possible effects of salina transformations on habitat selection and hatching success of Avocets. Whereas the number of wintering individuals seem to be fluctuating, the breeding population has suffered a strong decline of about 50 % during this decade.

Avocets in Cadiz Bay choose mainly either active or abandoned salinas as breeding, feeding and resting areas, instead of more transformed zones, such as fish-farms. Furthermore, Avocets show a higher hatching success in active and abandoned salinas (more than 50 % of successful nests), than in extensive fish-farms (only 14 % of successful nests). These results support the results from other coastal areas along the West Atlantic Coast. Conservation and regeneration of salinas seem to be as a good strategy to improve the conservation of the European Avocet population.

Some aspects of feeding ecology of



Grey Plover *Pluvialis squatarola* during autumn migration in Gulf of Gdańsk region

I. Kisicka

Waterbird Research Group KULING,
Dept. of Vertebrate Ecology & Zoology,
Univ. of Gdańsk, al. Legionów 9, 80-
441, Gdańsk, Poland

The feeding ecology of Grey Plover *Pluvialis squatarola* was studied at the Gulf of Gdańsk (southern coast of the Baltic Sea) in 1997. The results presented here concern only adults. The observations were made in three different feeding areas: a sandy beach, the sand bars of the Reda river mouth and an ash dump for the electric power plant. The data was gathered during three minute observation periods. In total, 147 observation periods were carried out. During these periods, time spent on pecking, resting, preening, acts of aggression, prey handling and kleptoparasitism were noted.

Birds spent 70% of their time feeding, 28% resting and 2% preening. The highest feeding intensity was observed on sandy beach (7.09 pecks per minute). Feeding intensity was lower on sand bars (3.77 pecks per minute) and on the ash dump of electric power plant (2.05 pecks per minute). Despite the differences in intensity of feeding the probability of taking and eating a food item in each peck was similar in all three feeding areas.

Autumn migration of Turnstone *Arenaria interpres* in Gulf of Gdańsk region

W. Meissner & L. Koziróg

Waterbird Research Group KULING,
Dept. of Vertebrate Ecology & Zoology,
Univ. of Gdańsk, al. Legionów 9, 80-
441, Gdańsk, Poland

Observations made between 1983 and 1997 showed that the majority of adult Turnstones migrate through the Gulf of Gdańsk region between mid-July and mid-August. Later on, adults are

observed only occasionally. Juveniles arrive about mid-August and reach their peak numbers in the first half of September. Adults migrating in July have significantly longer wings (157.1 mm) than those passing Gulf of Gdańsk in August (153.6 mm) (t-test, $t=2.50$, $p=0.018$). This indicates that females migrate first followed by males. There are no significant differences in mean wing length among juveniles migrating in subsequent seasons (ANOVA, $F=1.02$, $p=0.41$). The percentage of juveniles observed in subsequent seasons ranged from 38% (in 1992) to 96% (in 1985).

Primary moult of Dunlin *Calidris alpina* from Taimyr, Siberia

M. Y. Soloviev

Dept. of Vertebrate Zoology & General Ecology, Biological Faculty, Moscow State University, 119899 Moscow, Russia

Data on primary moult were collected from 111 Dunlins during summer seasons 1994-98 at south-eastern Taimyr, Siberia. In two 'late' seasons, estimated dates of the start of primary moult were delayed for 10-11 days compared to 'normal' seasons ($p<0.001$), but the estimated rate of moult was significantly higher in the former ($p=0.005$), resulting in similar dates of moult completion in the beginning of August. Moult rate did not differ between sexes ($p>0.1$), but males started primary moult on average two days earlier than females ($p<0.005$). The degree of intrapopulation variation found in the dates of primary moult, depending on a season's phenology, exceeds those formerly found between some of the Dunlin subspecies also moulting at the breeding grounds, which indicates higher control of this feature by environmental conditions than previously expected.

Autumn migration of the Ringed

Plover *Charadrius hiaticula* on the Atlantic Iberian coast

F. Hortas

Grupo de Estudio de Aves Marinas y Litorales (GEAM), Dpto. Biología Animal, Vegetal y Ecología, Fac. de Ciencias del Mar., Apdo. 40, E-11510 Puerto Real, Cadiz, Spain

Papers that analyse shorebird migration, and particularly that of Ringed Plover, on the Iberian peninsula (Figuerola & Martí 1994; Hortas 1997), are rare. In the case of the south Atlantic Iberian coast, they are practically non-existent, even though postnuptial migration is very important (Hortas 1997; Hortas & Pérez-Hurtado 1998). For this study we counted Ringed Plover during the postnuptial passage between the end of July and 1st October during 1988 and 1989 in a salina and adjacent intertidal mudflats in the Bay of Cadiz (south-west Spain). For the analysis we followed Tiedemann (1992). According to the results, the migration of this species was similar during the two study years. We found significant differences with respect to number of birds between the periods. However, the migration pattern was similar between years.

Shellfisheries and disturbances in waders in the south Atlantic Iberian coast.

D. Cuenca & F. Hortas

Grupo de Estudio de Aves Marinas y Litorales (GEAM), Dpto. Biología Animal, Vegetal y Ecología, Fac. de Ciencias del Mar., Apdo. 40, E-11510 Puerto Real, Cadiz, Spain

In recent decades, coastal habitats have disappeared, mainly due to human activities in industrialised countries. In Spain, 85 % are coastal wetlands and 40 % have disappeared in the last few years. Waders depend on these habitats to obtain the food resources to survive during the wintering, migration and breeding season. The decrease of feeding areas for these birds means a simultaneous increase in disturbances



from human activities. This work is a part of a study that proposes management measures for the control of shellfisheries within the Natural Park of the Bay of Cádiz (southwest of the Iberian Peninsula). This type of extractive activities, realised uncontrolled, could destroy the remaining intertidal invertebrate populations. An intertidal area of 145 ha at low tide was chosen, which was divided into 19 sectors. We counted birds and shellfisheries in all sectors. In one sector, censuses and behavioural observations of waders during the tidal cycle in the absence and presence of shellfisheries were carried out. The aim of this study was to monitor the distribution and the feeding behaviour of the birds and the changes before and after a disturbance.

Some of the results indicate that waders are non-randomly distributed, selecting the different feeding areas depending on the abundance and availability of their potential preys, and their feeding strategy. When some disturbance occurs, this distribution is altered, gradually being re-established when this disturbance disappears. However, in the disturbed sectors, we found higher densities than observed previously. Furthermore, during the study period, we have not found significant differences between the number of shellfisheries and the number of waders. On the other hand, the degree of human activity influences the capacity of the birds to become accustomed to human presence. Other factors that influence the behaviour of waders, such as the weather or the existence of alternative supratidal feeding habitats will be studied in the future.

Factors affecting wader populations in Hiaethog, North Wales

M. O'Brien

RSPB, Dunedin House, 17 Ravelston Terrace, Edinburgh, UK

A number of studies in the UK have shown that wader populations have

declined since the early 1980s. Factors associated with these declines include reductions in food availability, an increase in predator numbers and changes in habitat. This poster shows how these factors affect wader populations at one site in North Wales, and outlines subsequent fieldwork undertaken to compare these factors across a range of sites in the UK.

Durability, colour retention and incidence of encrustation of colour rings on Dunlins *Calidris alpina* breeding on a brackish meadow

O. Thorup

V. Vedsted Byevej 32, Vester Vedsted, DK-6760 Ribe, Denmark

Recognition of bird individuals by identification of unique colour ring combinations is a most useful tool in studies of breeding biology or migration. This method is especially suitable for studies of waders as most species frequently occur in wide open habitats thus allowing regular sightings of the birds' legs. Potential limitations in the use of this method in long-lived birds like waders are losses of rings due to wear or decomposition, fading of colours due to solar radiation, or encrustation by dirty sediment conditions that all make identification impossible or at least very difficult. Most recently difficulties in reading colour ring combinations have been discussed by Robinson & Oring (*WSG Bull.* 84: 45-46) and Browne & Mead (*WSG Bull.* 85: 8-9). This poster summarises my own experiences with colour-durability from studies carried out at Tipperne in Denmark.

INFORMAL WORKSHOP ON THE CONSERVATION OF SLENDER-BILLED CURLEW

BirdLife International acts as the secretariat to the Slender-billed Curlew Working Group, established under the Bonn Convention. The group held an informal meeting during the Wader

Study Group Conference in Hungary.

Dr Gerard Boere introduced the group and its work. Nic Peet from the BirdLife Secretariat then briefly described BirdLife's role before several priority issues were discussed. Nicola Baccetti from the Istituto Nazionale per la Fauna Selvatica gave an update on discussions about tagging and tracking birds. The group agrees that satellite tracking of Slender-billed Curlews *Numenius tenuirostris* should not occur until experiments on similar species such as Whimbrel *Numenius phaeopus* have been conducted and have demonstrated that the methods are safe and reliable.

Alexander Mikityuk from UTOP (BirdLife Partner Designate in Ukraine) reviewed recent records in the country and suggested sites that require further monitoring and a training programme for identification of the species for Ukrainian ornithologists. A lack of trained personnel, and therefore poor coverage of sites, is a problem for monitoring the species at several passage sites.

Recent work in the potential breeding areas in Siberia was updated by Vladimir Morosov and Elena Lebdeva from RBCU (BirdLife Partner Designate in Russia). Sites that require further exploration were identified. Janos Olah of the Hungarian Rarities Committee gave an update on recent records from Hungary and the need to continue monitoring and enhance protection in the country.

Nic Peet, BirdLife International

