

ongoing direction and management of this energetic and technically expert Group which continues to provide such valuable research data for the management and conservation of waders and wader habitats.

It would be nice to see the WSG's role continue to widen geographically in the future and to more effectively integrate the wader studies taking place throughout the world, especially the activities in the Americas and the Asia Pacific region. In due course, following the recent formal change of the Group's name to that of the International Wader Study Group, better regional co-ordination arrangements could and should be established with regional semi-autonomous WSGs in other parts of the world. This would further assist the establishment of effective networks of wader enthusiasts.

Clive Minton

1999 WSG MEETING

ABSTRACTS OF TALKS

The impact of Sea Empress oil spill on estuarine birds

Michael Armitage

Over 72,000 tonnes of oil were released when the Sea Empress ran aground at the entrance to Milford Haven, Wales. Some of the oil stranded on parts of the Cleddau Estuary, which hosts nationally important numbers of wintering waterbirds. Assessment was made of the number of birds using two polluted sites and two relatively clean sites on the estuary. Preliminary results suggest that the oil may have adversely affected five out of seven waterbird species investigated in detail. These were Oystercatcher *Haematopus ostralegus*, Curlew *Numenius arquata*, Redshank *Tringa totanus* and two wildfowl species: Shelduck *Tadorna tadorna* and Wigeon *Anas penelope*. The effects were mostly confined to the remaining winter period immediately after the spill and the following winter and there was evidence of recoveries of all species by the second winter after the spill. The fluctuations in these populations are discussed with reference to the availability of important prey organisms.

Habitat choice of coastal breeding birds in the changing Delta of the SW-Netherlands: lessons for the future?

Floor A. Arts¹, J. Graveland² & P.L. Meininger²

Coastal breeding birds (e.g. Ringed Plover, Kentish Plover, Avocet, terns) are a characteristic component of the coastal ecosystem and are considered to have a significant value from a conservation point of view. The Dutch coastal zone is of international importance for the NW-European population(s) of these birds. In the Delta area of the southwest Netherlands, the population sizes have changed dramatically since the 1950s. Terns and plovers have declined and are threatened. The populations of a few species, like some gulls, have increased exponentially. The Delta area is strongly influenced by humans. Human activities such as land reclamation, the Delta Project (construction of dams and/or storm-surge-barriers in sea-arms and estuaries), industrial development and recreation all had, or may have had, negative effects on the populations. On the other hand, nature restoration projects and industrial development may create new breeding sites, at least temporarily.

At present, the main problem seems to be the lack of suitable breeding sites. Dynamic conditions, caused by tide, salt, wind and flooding, have largely disappeared, resulting in vegetation succession and colonisation by ground predators. This problem can be expected to increase in the future.

We determined the habitat requirements of coastal breeding birds and have started to analyse 20 years of monitoring data. Our goals are to identify the chief causes of changes in numbers, and the importance of dynamic conditions, vegetation succession, predation and recreation for breeding. The results of the study will be used to advise managers and policy makers, in particular on the importance of dynamic conditions for these birds and on the optimal strategy for creation and restoration of new breeding sites. The first results of this study will be presented.

Winter site-fidelity and survival of Redshank at Cardiff, South Wales

Niall Burton

The site-fidelity of adult Redshank was investigated using colour-ringing and radio-tracking at Cardiff Bay, a wintering site in South Wales, in 1996/97 and 1997/98. Between 7 and 20% of colour-ringed adults were seen away from the bay in winter, although only at a distance of 4 km. Radio-tracking also suggested that adults were largely faithful either to the bay or to this neighbouring site. Return rates of 89% and 83% were estimated over two successive summers, indicating site-fidelity between winters. Survival rates of 91% and 100% were estimated over the two preceding (four month) winter periods. Annual survival rates, calculated as the product of the winter survival and over-summer return rates, were therefore 81% and 83%. These estimates are comparable to those previously obtained for Redshank, in studies on both breeding and wintering grounds.

Cost of reproduction in the Ringed Plover: The role for parasites?

Przemek Chylarecki

Ringed Plover is facultatively double-brooded in Central & Western Europe. In the study population in E Poland, 55% of females lay a replacement clutch following failure of the first clutch, but 36% of birds lay a genuine second clutch after a successful hatching of the first clutch. The probability of laying a replacement/second clutch is negatively influenced by investment in the first clutch as measured by egg length. Also the size of the replacement/second clutch is negatively related to breadth of eggs in the first clutch. Furthermore, controlling for interclutch interval and date, hatching of first clutch negatively influences egg size in a subsequent clutch. Among females that hatched a first clutch, the probability of laying a second one is negatively related to their ectoparasite burden. Female survival to the next breeding season is negatively related to first clutch egg length, particularly if coupled with the production of two clutches.

Overall, producing large eggs imposes fecundity costs in terms of reduced probability of laying a subsequent clutch

in the same season. Further costs are associated with hatching and may be related to energetic costs of brooding small chicks. Negative effects of ectoparasites on reproductive output are expressed only when coupled with presumed costs of chick rearing. Increased investment in egg size, although likely to enhance productivity (via chick survival), decreases the survival of the female parent. Recently, the role of ectoparasites as modifiers of the reproductive costs was studied by manipulating parasite load of incubating plovers. Results of these experiments will be reported.

How many waders are there – and where are they?

Nick Davidson

Our knowledge of wader distributions, population sizes and trends and migration patterns has increased enormously over the last decades. Despite this, there are still many gaps. In their global analysis Pierma *et al.* (1997) reported that globally there is information on population size for only 46% of wader species, and about their migrations for only 22% of species. At the level of biogeographic populations it is likely that these figures are even worse. Yet population and migration information is increasingly vital in underpinning and directing priorities for the increasing activity in delivering flyway-scale conservation.

Using standard global sources, this paper tries to summarise the comparative characteristics of each of the wader flyways – how many are threatened, how many are migratory, locally dispersive or sedentary, where are the main gaps in knowledge – and also assesses the extent to which the flyways as described in the Odessa Protocol really reflect the migration patterns of the populations. Using many approximations, I also try to make a first globally comparable estimate of the total numbers of waders present on each flyway. The compiled information used for these analyses could provide the basis for developing a more detailed sourcebook of information about the characteristics of each flyway population, to assist all those involved in flyway research and conservation.

Anti-predator behaviour of prey cannot be ignored in predictive studies of shorebird distribution

Pim Edelaar¹, Patrick Triplett³, Cédric Fagot³ & Bart Groeneveld¹

Many studies of shorebirds are concerned with the relationship between the birds and their food in some way. In almost all of these studies, food availability has been treated as a crucial factor. But how detailed should one's measure of food availability be? One might argue that this is a matter of time scale. Prey reproduction, mortality, growth or starvation are usually in the order of weeks to months. But food availability can change in shorter time frames too. Examples come from studies concerned with indirect interference: prey is scared away by other birds. A negative relationship between the availability of prey and the density of predators results. It is this available fraction that must be measured. Unfortunately short-term studies on less mobile prey like bivalves are immune from effects of indirect interference. At the approach of a predator, cockles, mussels and sandgapers withdraw their siphons and/or shut their valves tightly, thereby increasing search- and handling times. Some of our own work has shown similar effects, but in the order of days to weeks. In the Baie de Somme, France, due to hunting the intertidal area is divided into two zones, one with high and one with low bird densities. We collected samples from both habitats.

Macoma balthica was buried much deeper in the high bird-density area than in the low bird-density area. Bird exclosures showed that this was not due to selective predation of the shallow individuals, but tellins responded in a flexible way. *Cerastoderma edule* had thicker shells and lower energetic values in the high than in the low bird-density area. We cannot exclude selective foraging, but other studies have revealed that prey can respond to predator presence by growing thicker shells. This reduction of cockle profitability may therefore represent a case of indirect interference on a longer time-scale.

To conclude this talk, I want to make the point that the value of an individual prey can change as an effect of shorebird presence. Shorebirds may anticipate these interference effects by 'managing' their prey stocks. e.g., group living can

lead to increased indirect effects if prey only respond to high levels of predation, but may lead to decreased indirect effects if long periods of no disturbance occur in some areas, depending on the prey species. Studies that wish to understand shorebird foraging behaviour or habitat use, should include prey behaviour as an important variable.

Why are Oystercatcher populations declining in the Netherlands?

Bruno Ens

Oystercatcher populations breeding in the Netherlands are declining. Many of these birds winter in the Dutch Wadden Sea and the Delta area. Cockles and mussels are the staple food at that time of the year. The stock of these bivalves is quite variable from year to year as severe winters may take a heavy toll and recruitment may fail for a number of years in a row. Over the last few decades, commercial fishing of cockles and mussels by large boats has increased in this period and the intertidal mussel beds (with a total surface area of 4,000 ha and which used to harbour a major share of the 200,000 Oystercatchers in the Wadden Sea) have virtually disappeared from the Dutch part of the Wadden Sea and has not recovered, despite the implementation of a new shellfishing policy. Almost certainly as a result of this, the mortality of Oystercatchers, which also depends on the severity of the winter, has increased. Current work is aimed at modelling the long-term consequences of the current shellfishing policy for the Oystercatcher population.

Importance of estuarine (brackish) tidal flats for Broad-billed Sandpipers and other shorebirds-species on spring-migration in the Wadden Sea of Schleswig-Holstein, Germany

Klaus Günther

Estuary (brackish) tidal flats are endangered and scarce habitats. Large areas of these tidal flats have been destroyed or changed by constructions for coast protection and embankments. In the Wadden Sea of Schleswig-Holstein, Germany, estuarine (brackish) tidal flats only exist in the Elbe and Eider river estuaries, of which the Eider estuary is not natural any more because a storm barrier was built in

1972 allowing a reduced tidal–dynamic of salt–water. For some shorebird species the estuarine tidal flats are by far the most important spring staging areas in the Wadden Sea for fattening up during the pre–breeding migration. Approximately 100 Broad–Billed Sandpipers, more than 1,000 Curlew Sandpipers, 500 Little and 200 Temminck's Stints and also up to 5 Terek Sandpipers stay for some weeks on the brackish tidal flats. Most of these species also use freshwater habitats, but in much smaller numbers. Other shorebird species or populations with high arctic breeding grounds like Knot, Bar–tailed Godwit and Ringed Plover also use these tidal flats in large numbers in late May just before departing.

Shellfisheries and waders: does the Dutch policy work?

Tom M. van der Have

Three mild winters in a row during a peak of the North Atlantic Oscillation (NAO) in 1989–91 led to a failure of mussel and cockle spatfall in the Dutch coastal waters. Mussel and cockle fisheries depleted the remaining shellfish stocks almost completely, which resulted in high mortality of Eiders and Oystercatchers and the complete disappearance of mussel beds in the Dutch Wadden Sea. After intensive lobbying by NGOs, the Dutch Government implemented a new shellfishery policy in 1993. A small part of the Wadden Sea (26%) and Delta (15% of the Eastern Scheldt) were closed permanently to industrial shellfishing, and in years with low shellfish stocks only 60% of the food demand of shellfish eating birds is reserved for the birds. If in a certain year the stocks are below the 60% food demand level, the shellfishery is closed. Co–management by the shellfishery sector was applied in the remaining areas, but the additional measures taken were insignificant. The ecosystem effects of industrial shellfishing, and cockle dredging in particular, are complex and manifold. A five–year monitoring and evaluation study, however, failed to assess the direct effects of fishing properly, in part because the fishing intensity data were not made available by the fisheries sector. A very moderate recovery of mussel beds and eelgrass beds occurred only in unfished areas and periods without intertidal shellfishery, while

Oystercatcher numbers declined. Based on these poor conservation results the Dutch government decided to implement more restrictions for 1999–2003: an additional 5% of the intertidal flats will be temporarily closed in the Dutch Wadden Sea and the food reservation will be 100% of the food demand of Oystercatchers in the Eastern Scheldt.

If the upward trend in the NAO continues the prospects for shellfishery and oystercatchers are rather bleak: decreased frequencies of cold winters will lead to less frequent mussel and cockle spatfall and low shellfish stocks for many years. Even under the current policy the intertidal flats may be closed for long periods. If mussel bed recovery remains poor, the decrease in Oystercatcher numbers may continue. A complete closure of the intertidal flats for industrial shellfishery and buy out of the relatively small cockle fishery seems to be the only sensible and sustainable option left.

“... and now the latest NEWS”

Steve Holloway

As part of the Non–estuarine Coastal Waterfowl Survey (NEWS) the waders and wildfowl around the United Kingdom coastline were counted during winter 1997/98. The results show significant declines in the numbers of Ringed Plover, Sanderling, Purple Sandpiper and Turnstone since the last full survey (the 1984/98 Winter Shorebird Count). Conversely, there have been increases in some species such as Greenshank, usually thought to have a more southerly distribution. Changes are discussed in terms of a possible redistribution linked to factors such as global climate change.

Why can avocets *Recurvirostra avocetta* breed in the Wadden Sea?

Hermann Hötter

On the coast of the Wadden Sea, avocet chicks grow up on open mudflats where they are often exposed to harsh weather. Respiratory measurements of energy expenditure revealed that avocet chicks did not possess special adaptations to cope with the high thermostatic costs in their habitats. Even older chicks depended on heat transfer and shelter provided by brooding parents. In

periods of bad weather brooding periods were so long that foraging time was reduced to levels insufficient for growing or even maintaining body mass. The conflict between the time demands of brooding and foraging was particularly sharp at inland sites where chicks mainly fed on small chironomid larvae. Chicks growing up on intertidal flats of the Wadden Sea took much bigger food items (*Nereis diversicolor*) and needed much less time for ingesting the same amount of energy as the birds in inland sites. Measurements of standard operative temperatures with heated taxidermic mounts showed that the Wadden Sea area is climatically the least favourable part of the breeding range. The rich supply of prey of much larger in size than known from other breeding sites seems to be the key for understanding the existence of the prosperous population of avocets in the Wadden Sea.

What affects egg–size variation in the avocet *Recurvirostra avocetta* L.?

Hermann Hötter & Tobias Dittman

In its natural habitats, the avocet nests on open ground in temporal wetlands where breeding conditions can change for the worse within a short time. In order to minimize this hazard, the incubation time should be as short as possible. This problem is tackled by laying relatively small eggs which can be incubated more effectively. Therefore avocet eggs hatch earlier and bear smaller chicks in comparison to other waders. On the other hand small eggs have a lower capacity of heat retention and small chicks will get problems sooner with thermoregulation during periods of cool weather. Thus, one could expect that for an optimal adaptation to climate, eggs that are laid early in season should be bigger than late ones. The following study deals with the question whether the variation in egg size can really be considered as an adaptation to climate or if it is implied by a factor concerning the female itself such as physical condition, age or social state.

Gut parasite load of Oystercatchers and spatial distribution

Sophie Le Dréan–Quénez' hdu & John Goss–Custard

We report a study of a gut parasite load

of wintering Oystercatchers *Haematopus ostralegus* from the Exe estuary (UK) in order to examine a possible relation with their spatial distribution. The study was carried out during winter (October–March) on different feeding sites (mussels beds, cockles area, fields). The method used is coprology, which is the research of parasite eggs in waders droppings. We found principally eggs from the trematode *Psilostomum brevicolle* and from the nematode *Capillaria* sp. *Psilostomum brevicolle* could be transmitted by eating mussels, *Capillaria* sp. by eating earthworms. There are no significant differences in parasite load between months. We show that some Oystercatchers have more parasites than others: the birds feeding on adjacent fields during high water had the highest load of both species of parasite. These birds are equally less efficient in foraging during low tide. The difference of parasite load of Oystercatchers could not be explained by a difference of risk of exposure as shown by a study of parasite load of mussels. We suggest that some birds are more resistant than others to parasite infection.

Patterns of habitat use by Lapwing *Vanellus vanellus* and Golden Plover *Pluvialis apricaria* in South Portugal farming systems

Domingos Leitão

This study was made on two consecutive winters: 1997/98, and 1998/99. We selected four study areas in order to sample as wide a range of soil type and farming systems as possible. Two of them are located in the Tagus river alluvial plain (Azambuja and Lezíria Sul). The other two are located further south in the Alentejo region: one inland (Castro Verde) and the other near the coast (Odemira). In the winter of 1997/98 the Lapwing was common in all study areas, while the Golden Plover occurred commonly only in Castro Verde. In 1998/99 the Lapwing was common in all study areas, apart from Castro Verde, while the Golden Plover was common only in Lezíria Sul. In the first winter all birds had departed on their spring migration by mid February, while in the second both species stayed until mid March.

The pattern of habitat use by Lapwing was distinct in the four study areas, even between those with similar farming systems. Stubble and ploughed stubble

were both used by Lapwing in the study areas of the Tagus alluvial plain, both as feeding and as roosting grounds, while they were least favoured in Odemira. In Castro Verde this species used also winter cereal, specially in early winter. In late winter there was a tendency for using ploughed stubbles and other ploughed fields more for roosting and less for feeding. Golden Plover used stubble and ploughed fields to a lesser extent than Lapwing. Winter fallow and pastures were strongly used by both species in all study areas mainly as feeding grounds. In 1998/99 both species used the intertidal mudflats near the Lezíria Sul study area throughout the winter, for both feeding and roosting, a pattern that was not observed in the previous winter. Lapwing (and also Golden Plover) used fields with higher invertebrate abundance and low vegetation cover and growth, at least at some periods of the winter. There were differences between both winters in the extent of winter farming (especially winter plough), invertebrate abundance, and vegetation growth rate. These factors definitely affected the way the birds used the farming system in these two winters.

Wader studies in Northwest Australia

Clive D.T. Minton

The shores of N.W. Australia hold up to three-quarter of a million waders, from an incredible 50 species, making it one of the top locations in the world. Since 1981 counting, banding, visible migration departure watches, radar studies and, most recently, food and feeding research have been carried out by a series of international expeditions and, since 1988, also by the people based at the newly established Broome Bird Observatory. The presentation will highlight the main results of this long term research, including those obtained during the largest ever expedition (127 people from 18 countries) in August–October 1998.

Why do Oystercatchers *Haematopus ostralegus* prefer brown-coloured Mussels?

R. Nagarajan, J. D. Goss–Custard and S.E.G.Lea

Oystercatchers *Haematopus ostralegus* in the river Exe estuary, England feed mostly on edible mussels *Mytilus edulis* by hammering through the shell. In the

mussel population, 86.4% were black in colour and the remaining 13.6% were brown in colour whereas in Oystercatchers' diet, 65.6% were black and 34.4% were brown. A Chi-square test showed that the Oystercatchers preferred to attack the brown coloured mussels ($X^2 = 64.71$; $P < 0.001$). The preference of Oystercatcher mussel selection towards brown colour shells could be due to differences in either morphology or physiology between the brown and black mussels. Step-wise multiple regression equations were calculated, using mussel morphometric characters (whole mussel weight with flesh, shell weight, right and left ventral thickness and number of blows needed to break the shell) and physiological characters (flesh wet weight, dry weight, water weight, ash weight and Ash Free Dry Mass as response variable, and length, day and colour as independent variables. Results showed that the brown colour mussels were lighter (whole mussel weight co-efficient for colour -0.068 ± 0.015 ; $P < 0.0001$) and also shells were lighter (co-efficient for colour -0.122 ± 0.032 ; $P < 0.0001$). The right ventral side of brown coloured mussels was thinner than black mussels (co-efficient for colour -0.05 ± 0.024 ; $P < 0.0001$) and so were their left ventral sides, though this effect fell just short of significance, (co-efficient for colour -0.04 ± 0.024 ; $P = 0.078$). However, the number of blows needed to break the shell did not differ between brown and black colour mussels. There was no difference between mussels of different colours for Ash Free Dry Mass (AFDM), dry weight and ash weight, but the wet weight of brown coloured mussels was less (co-efficient for colour -0.061 ± 0.019 ; $P < 0.005$), because of a lower amount of water (water weight co-efficient for colour -0.066 ± 0.015 ; $P < 0.0001$). Although the wet weight differed between the mussels, there was no significant difference in AFDM. So by selecting the brown colour mussels the Oystercatchers would not increase their intake rate, but could eat more flesh in a feeding bout, by avoiding the excess water, which would use up available stomach volume.

A further multiple regression equation was calculated for mussels that had been opened by Oystercatchers regressing left ventral thickness (for right-side opened mussels) against colour (black = 1 and brown = 2) and length. The co-efficient for colour was 0.01737 ± 0.01702 ($P = 0.423$; $N = 376$). Thus the thickness

did not differ significantly between the mussels, if anything the thickness was higher for brown than for the black mussels. From this analysis it was inferred that the Oystercatchers even took thick shelled brown colour mussels.

The same trend was seen for left side opened mussels (co-efficient for colour 0.00536 ± 0.02456 ; $P=0.828$; $N=149$). These results thus suggest that the Oystercatchers preferred to feed on brown colour mussels due to mussel physiological properties rather than morphological characters.

Solent Shorebird Studies

Peter Potts

The presentation will attempt to raise the importance of the Solent estuary on the south coast of the UK between Chichester in West Sussex and Southampton & the New Forest in Hampshire and the Isle of Wight, as an estuary of international importance for waterfowl. Current research projects on a range of the Solent's wader populations will be discussed with the aim of raising awareness of the range and depth of project work being undertaken, by both the the Solent Shorebird Study Group, the Farlington Ringing Group and the environmental consultancy Ecological Planning & Research. One of the aims of the lecture will be to encourage our fellow wader workers on the continent to record and submit records of marked waders from the Solent and to try to encourage international participation in our work. Colour-ring projects on four species of wader in the Solent, together with an on-going colour-dyeing project and radio tracking work being carried out in relation to the proposed extension of Southampton Docks will be highlighted. Finally some initial results of the Farlington Ringing Group's Black-tailed Godwit colour-ringing project and recent excursions to Iceland will be illustrated.

Waders on Sea Lion Island (Falkland Islands)

Gerlof Th. de Roos

The Falkland Islands, an archipelago composed of some 420 islands, are situated in the South Atlantic between latitudes 51° and 53° south and longitude 57° and 62° west and approximately 450 km north-east of

Tierra del Fuego and 600 km east of Patagonia. The nearest point of the Antarctic Peninsula is about 1,200 km away. Lying on the northern edge of the depression belt, which passes through the Drake Passage, the islands experience fairly continuous variations in weather, caused by air masses and fronts which pass across.

Sea Lion Island is the most isolated of the Falklands' inhabited islands. The island has 49 species of (migratory and breeding) bird including five penguin species. The beaches host the major Elephant Seal breeding population in the Falklands.

Among the breeding waders are:

Two-banded Plover *Charadrius falklandicus*, preferring sandy beaches with marginal cover from Sea Cabbage *Senecio candicans*, kelp and driftwood debris. It will often nest in close association with Pied Oystercatcher or Magellanic Oystercatcher *Haematopus leucopodus*, apparently using this large species' aggressive nature as a form of defense against predators. Common snipe *Gallinago gallinago* also breeds on the island. The White-rumped Sandpiper *Calidris fuscicollis* is a transequatorial migrant, breeding on Arctic coasts of North America. It often also associates with Two-banded Plover. Whimbrel *Numenius phaeopus hudsonicus* and Sanderling *Calidris alba* are also annual or regular visitors. Tussock Grass Poa (*Paradiachloa flabellata*), a unique plant species, forms the Falkland Islands' most important terrestrial ecological niche as both a nesting and feeding habitat for many bird species.

Contrasting day and night feeding habitat of red knots *Calidris canutus* in Patagonia: profitability versus safety?

Humphrey P. Sitters, P.M. Gonzalez, T. Piersma, A.J. Baker & D.J. Price

By radio-tracking and recording the movement of flocks, the day and night feeding distribution of red knots *Calidris canutus rufa* was studied at a migration stop-over site near San Antonio Oeste, Rio Negro, Argentina in March and April 1998. By day, the birds fed in dense flocks of 500–4,000 on an area of restinga or rock platform where there were beds of the small mussel *Brachidontes rodriguezii*. This appeared to offer the best feeding opportunity in the area. By night, the restinga was

deserted and the birds were found widely scattered over nearby sandflats. It was evident that the birds were feeding at night because variation in the signal strength from some of the radio-transmitters indicated that the birds were active, and fresh knot droppings were found in an area which only became exposed by the tide after dark.

The likely reason why the birds fed on the restinga by day but not at night is that this behaviour afforded protection from nocturnal predators. By day, with good visibility and many eyes to aid predator detection, it was safe to feed on the restinga which provided the best source of food. They avoided the restinga at night because it is close to terrestrial habitats and possible sources of nocturnal predators that are difficult to see. The aggregation of the birds by day and the dispersion at night may also reflect changing strategies to avoid predation. By day, predators are easy to see and there is safety in numbers. By night, predators are difficult to see and large numbers may attract them so it is safer to disperse. The different day and night distribution might also reflect the concentration of the birds' daytime food on the restinga and the widely dispersed resources they exploit at night.

Wonders about Wandering Tattler

Pavel Tomkovich & Gill R.E., Jr.

Abstract is missing

Body mass patterns of Little Stints during incubation and chick-rearing at different latitudes.

Ingrid Tulp, H. Schekkerman, P. Chylarecki, P. Tomkovich, M. Soloviev, L. Bruinzeel, K. Van Dijk, O. Hilden, H. Hötter, W. Kania, M. van Roomen¹, A. Sikora and R. Summers

Data on body mass dynamics during incubation and chick-rearing for Little Stints *Calidris minuta*, collected at 12 sites during 17 expeditions in the Eurasian Arctic are presented, ranging from northern Norway in the west to northeastern Taimyr in the east. Due to the 'double-clutch' mating system found in this species, each parents singly attends a clutch or brood, and time available to feed is limited, especially in

the incubation stage. We studied body mass patterns in relation to the stage of incubation and to geographical location. In the six studies where measurements both before and after hatching were available, body mass was higher during the incubation phase than during chick-rearing, with a rapid decrease in body mass starting on the hatching day. Repeated weighings of the same individuals showed the same pattern. Structural size, as estimated by wing length, increased with latitude. This was probably caused by relatively more females (the larger sex) incubating further north, possibly after leaving a first clutch to be incubated by males further south. After correction for this trend in structural size, a strong latitudinal effect was still found on the body mass during both incubation and chick-rearing: in the northernmost sites, Little Stints have higher body masses compared to more southerly sites. This observation mirrors a well-known phenomenon in overwintering shorebirds, where geographic variation in energy stores parallels the risk of encountering periods of negative energy balance. Similarly, we interpret the large energy stores of breeding Little Stints as an insurance to overcome periods of cold weather which are a regular feature of arctic summers. Climate data showed that the risk of encountering coldspells lasting several days increases with latitude over the species' breeding range, and is larger in June than in July. Maintaining these stores is therefore less necessary at southern sites and during the chick-rearing period than in the incubation period. When guarding the chicks, the time for feeding may be less constrained than during incubation. Additionally, temperatures in this period tend to be higher than in the incubation period, reducing energy expenditure, and the availability of insect prey reaches a seasonal maximum.

Nocturnal flight altitudes of waders flying to and from high tide roosts

Jan van der Winden, A.L. Spaans & S. Dirksen

Tidal areas are attractive for the planning of wind farms. These areas are also important staging areas for huge numbers of waders during migration and winter. Wind turbines can affect these birds in two ways. First, birds may collide with the turbines when crossing wind farms on

their daily feeding, drinking or roosting flights. Second, the turbines may disturb the birds' resting and feeding areas or disturb the birds in their flight path. In general, collision risks are highest at night especially during dark nights and bad weather circumstances. In areas with high numbers of waders flying from mudflats to high tide roosts and back, information is needed about flight paths and flight altitudes of waders during nocturnal circumstances. This knowledge may contribute to risk assessment for wind farm planning.

In the period 1994 to 1998, a study on nocturnal flight altitudes was executed at several locations near tidal areas in the Delta and Wadden Sea, The Netherlands. For this research a modified ship radar was used to measure flight altitudes and additionally a standard ship radar was used for the study of flight paths. Field observers simultaneously registered species composition based on calls. Nocturnal controls of high tide roosts, that were used during daytime, showed that waders can use different high tide roosts at night than during daytime. The numbers of waders on flight paths between mudflats and high tide roosts could amount to several thousands per hour per 10,000 m² (vertical) air surface. The flight altitude of waders was on average below 100 m and mostly below 75 m. Oystercatchers flew lowest, while Grey Plover, Curlew, Dunlin and Bar-tailed Godwit flew on average highest. In cases of strong tail wind all species flew on average higher than with head wind.

The conclusion is that planning wind turbines in situations with large numbers of waders passing to or from high tide roosts is risky. Birds have to pass at least two times per night, and flight altitudes are within the range of the height of modern wind turbines.

1999 WSG MEETING

ABSTRACTS OF POSTERS

Breeding waders in Brittany

Bruno Bargain

We report a study conducted from 1995 to 1997, in order to estimate abundance and distribution of breeding waders in Brittany, and develop a conservation strategy. 13 species regularly breed in Brittany, of which most have very small populations (less than 100 pairs). An

analysis of trends in numbers over the last 30 years indicated a decline for most species, particularly for lapwing and snipe. The main factors involved in the decline of breeding waders are changes in agricultural practices, disturbance by recreation activities and hunting, and predation. Different conservation measures are proposed and discussed.

April numbers of waders at two sites in Moçambique

Carlo Bento & Rui Rufino

During the first week of April 1999 two sites were visited and the waders present counted. The northern one, Bazaruto Island, is known to hold important numbers of waders during austral summer whereas for the second one, Inhambane Bay little information was available concerning its wader populations. These counts covered only part of each site but provide information on species compositions at that time of the year and allow for an extrapolation of total numbers. At Bazaruto a total of 1,495 waders of nine species were actually counted; *Calidris ferruginea*, *Pluvialis squatarola* and *Charadrius marginatus* were the commonest species. The area surveyed at Inhambane bay had a total of 1,017 waders of 12 different species, with *Pluvialis squatarola*, *Arenaria interpres* and *Xenus cinereus* being the commonest ones.

Mise en place d'un observatoire des limicoles côtiers, milieux littoraux et estuariens français – Lancement du projet et appel participation

Emmanuel Caillot & Jean-François Elder

Espaces protégés susceptibles d'être concernés :

Les Réserves Naturelles et Réserves Naturelles Volontaires;
Les Parcs Naturels Régionaux;
Les Conservatoires régionaux;
Les propriétés du Conservatoire du Littoral ;
Les Réserves Nationales de Chasse;
Les propriétés des Collectivités (Conseil Généraux, Syndicats mixtes...)
Constat : Si de nombreux sites sont régulièrement suivis, seuls les dénombrements du 15 janvier (W.I.) font l'objet d'une analyse globale. Toutefois, ils ne suffisent pas à caractériser l'importance, le rôle, et

surtout le fonctionnement des espaces naturels vis à vis des limicoles.

Objectif : Evaluer le rôle des réserves naturelles, et des autres espaces protégés français, dans la conservation de la biodiversité en général et dans la gestion des milieux littoraux et des populations de limicoles côtiers européens.

Moyens : Connaître les modalités d'utilisation spatio-temporelle des espaces par les limicoles ; Initier une approche globale de préservation et de gestion des espaces naturels littoraux et estuariens.

Prolongements attendus:

- Rendre compte de l'évolution de la qualité des milieux littoraux, notamment des sites Natura 2000, en utilisant les limicoles côtiers comme indicateurs ;
- Initier, à travers la démarche de Réserves Naturelles de France, dans le cadre de réseaux européens, la mise en œuvre de programmes de recherche adaptés à la conservation des populations de limicoles fréquentant nos sites ;
- Alimenter la base de données de l'observatoire du patrimoine naturel de R.N.F. et évaluer le rôle et l'importance des R.N. dans la conservation des limicoles côtiers ;
- Contribuer à l'élaboration des documents Natura 2000 ;
- Contribuer à la création de réserves naturelles en adéquation avec des démarches « espaces protégés français et européens » (complémentarité, orientations stratégiques...).

Outil proposé: Des dénombrements synchronisés sur un ensemble de sites, à partir d'un protocole standardisé : un dénombrement mensuel, situé vers le 15 de chaque mois et un dénombrement décadaire en période d'escalas migratoires, prévu d'avril à mai et d'août à septembre.

Coordination : Pour le groupe « oiseaux » de R.N.F., le personnel de la R.N. de Beauguillot (50) se propose d'assurer la coordination de l'observatoire. Pour y participer et obtenir des renseignements complémentaires : Emmanuel CAILLOT ou Jean-François ELDER.

Impact de la prédation sur une colonie d'avocette *Recurvirostra avocetta* au parc du Marquenterre (Réserve naturelle de baie de Somme – France)

Philippe Carruette

L'avocette *Recurvirostra avocetta* niche pour la première fois sur la côte picarde en 1975 avec 12 couples au Parc ornithologique du Marquenterre bénéficiant de la tranquillité de cette réserve à l'origine privée créée en 1973. Comme c'est souvent le cas pour les colonies d'avocettes, celle du Marquenterre subit de 1975 à 1999 d'importantes fluctuations d'effectif dues principalement à l'impact de prédateurs naturels. Une phase d'expansion de 1975 à 1983 avec un maximum de 108 couples en 1983. Pour ces années les bulletins de l'Association Marquenterre nature renferment peu de données sur le succès de reproduction. Une phase de déclin de 1984 à 1994 (24 nids pour cette dernière année) avec la quasi-absence de jeunes à l'envol. Malgré cet échec de longue durée les sites traditionnels de nidification aménagés pour l'espèce sont réoccupés chaque année.

Une nouvelle phase d'expansion de 1995 à aujourd'hui (84 nids en 1999) grâce à des jeunes qui parviennent à l'envol même si le nombre reste faible et la prédation importante. La prédation s'exerce à différents stades de la nidification et par plusieurs espèces. Destruction totale des oeufs sur les îlots par le sanglier (1997–1998). Destruction totale ou partielle des oeufs par le renard (1992, 1994, 1996, 1999). Prédation faible sur les oeufs par un couple de goélands argentés nichant sur la colonie (1995 et 1996). Prédation spécialisée importante sur les poussins de moins de 15 jours par le goéland argenté, la corneille noire et en 1999 par un mâle de faucon crécerelle. Prédation occasionnelle sur les poussins de moins d'une semaine par la mouette rieuse et un mâle d'épervier en 1999. Les différentes techniques de prédation sont décrites ainsi que les mesures ponctuelles qui peuvent être prises. A cette prédation naturelle s'est ajouté au moins pour une année le vol d'oeufs à but de collection.

Distribution of *C. alpina* in an estuarine Area (southwest Iberian Peninsula). Relation with type of sediments and effects of human activity

David Cuenca & Francisco Hortas

Wader distribution in their feeding areas depends on a large number of factors, mainly the distribution, abundance and availability of their prey species. At the same time these three variables depend on sediment characteristics, and on the width of the shore as well as tidal inundation time. Knowledge of the distribution of substrate particle size can give us an answer to the question why birds distribute in that particular way. *Calidris alpina* is the most abundant species in our study area, representing nearly 45 % of the total number of birds. On the other hand, shellfishers can change the ideal distribution of this species, forcing birds to move to poor feeding areas with low densities of their prey species.

Four winter censuses and two spring censuses of the birds present and their activity, were carried out in a specific area of intertidal flats of Cadiz Bay Natural Park (southwest Iberian Peninsula). First, we divided the study area into 19 plots. Furthermore, plot number 5 was counted several times every half an hour during the low tide period, with and without human disturbance. The percentage of the different grain size classes and the median grain size (D50) was calculated for each plot.

There is a clear size gradient in grain size from the mouth of the estuary, where we find the highest percentage of sand, to the highest part of the inlet, where there is no sand and we find the smallest grain size. The distribution of birds is clearly different depending on the grain size and it changes depending on the species. *C. alpina* selects the smallest particle size areas to forage, preferring clay and silt sectors over the more sandy ones. In the plots 12 to 15 the mean grain size is less than 10 m and *C. alpina* reaches a density of 55 birds per hectare. In relation to disturbance, the comparison between numbers of *C. alpina* in censuses with and without disturbance shows a strong decrease of the number of birds when disturbance occurs, and a progressive recovery when it disappears. In the future, a complete study of the distribution of waders, distribution of

benthic invertebrates, its relation with sediment characteristics and effects of human activities can allow us to make an adequate management of intertidal areas.

New data on Black–Winged Stilt *Himantopus himantopus* outside the breeding season

Philippe Delaporte, P.J. Dubois & H. Robreau

From 1983 to 1994, a team from the LPO carried out a study on the factors determining settlement, reproductive success and seasonal movements of Black–winged Stilt *Himantopus himantopus* in the marshes to the west of France and the ponds of the Languedoc–Rousillon and during two visits to Africa, to Morocco and Senegal. 1726 birds were ringed, mainly during the breeding season, along the Atlantic coast from Morbihan south to Charente–Maritime (1,617 individuals) and in the mediterranean « départements » of Aude and Hérault (83 individuals). 26 birds were caught and ringed in Morocco in the autumn of 1986.

Overall, 1495 chicks and 70 adults or fledged young were fitted with colour rings (combinations of 13 colours) and with a Paris Museum metal ring (2 rings per tibia). On the 30th August 1999, 371 stilts had been resighted at least once (i.e. 23.7% of the colour–ringed birds), of which 102 individuals per 124 resightings were outside their original capture site. The results presented concern these individuals. During autumn migration, 32 sightings of 22 juveniles were made from July 31st to October 29th, between south–west France and Morocco, of which a majority (56%) were made in the southern marshes of Portugal and Spain to the north of Morocco. During winter, 22 sightings made between November 9th and March 2nd occurred : in southern Spain (2 cases), on the central Atlantic coast of Morocco (2 cases), but essentially in the south of the Sahara between 11 and 17°W. The 20 sightings categorised as spring migrants are more difficult to analyse. Obtained from north Morocco to the south–west of France between March 13th and May 17th, they suggest a more continental and mediterranean migration across Spain.

During the breeding season, 41 Black–winged Stilts nested, attempted

to nest or remained in Europe in an area between Portugal in the west, Hungary in the east and Germany to the north. Sexed individuals produced a balanced sex ratio. 78% of these birds were never resighted on their original migration route and probably changed their breeding area due to population mixing in the wintering area.

Wintering behaviour of Purple Sandpipers *Calidris maritima* and Turnstones *Arenaria interpres* on the Northumberland coast

Mark Eaton

Behavioural studies have been conducted over the last three winters on Purple Sandpipers and Turnstones on the Northumberland coast. Approximately 250 birds have been marked with individual colour–ring combinations and 29 with radio–tags. Purple Sandpipers show marked variation in their fidelity to the main wintering site, with smaller birds utilising neighbouring sites more frequently. It is hypothesised that the dominant large individuals are excluding subordinate smaller birds from the preferred (mussel–rich) site forcing them to feed at poorer quality sites up to 8km away. Turnstones show a wide range of vagility over the wintering period. Some individuals are extremely site faithful, while others travel up to 30km between feeding sites. Individual birds may utilise different food resources to varying extents, with some feeding chiefly on inter–tidal invertebrates while others make greater use of ephemeral high tide food sources such as strand–line wrack deposits. Ongoing work aims to reveal the role of social ranking in determining feeding strategy.

Dealing with tidal constraints: The use of internal and external cues for timing of foraging by Oystercatchers

Pim Edelaar

In my study area (Dutch Wadden Sea), the European Oystercatcher is highly dependent on intertidal mudflats for obtaining its bivalve prey, but it roosts inland behind a dike, and out of sight of the water. Since mudflat exposure does not accurately following tabulated waterlevels due to the influence of strong winds, it is uncertain whether or not Oystercatchers should use either a tidal clock or environmental cues (wind force and direction) to time their tidal

migration flights. I used the relationship between the arrival of Oystercatchers relative to low tide and the actual mudflat exposure time relative to low tide to test which information was used. If Oystercatchers would use environmental cues only, we would expect a slope of 1: if the mudflat exposes late, the birds are late. If Oystercatchers would use internal clocks only, we would expect a slope of 0: if the mudflat exposes late, the birds arrive at the same time (relative to low tide) as always. Observations collected during two months show that the slope of the linear regression line is actually intermediate and significantly different from 0 and 1 (slope = 0.48 (95 % confidence interval from 0.31 to 0.65), n=40, R2=0.47, p<0.001). This finding indicates that both sources of information – internal clocks and external environmental cues – are used: internal tidal clocks for a rough estimate and environmental cues for an adjusted prediction (but no 'inspection flights' above the roost were seen). Evidence for tidal clocks in birds is rare, but may be more common (and important) than reported so far. It is possible that the implementation of environmental information in the decision making is learned (since the effect of wind on waterlevels will be area specific). An indication for this is that most individuals that arrived early when the mudflat exposed late where juveniles, whereas only a small proportion of the total population is. Knowledge of local mudflat exposure may promote site–loyalty in adults.

Creation of temperate–climate intertidal mudflats: factors affecting colonisation and use by benthic invertebrates and their bird predators

P.R.Evans, R.M.Ward, M.Bone & M.Leakey

Intertidal land has been removed from coasts and estuaries by human agency for a variety of purposes. If intertidal flats can be constructed successfully from an engineering standpoint, new areas could be created to replace areas that have to be destroyed if «nationally important» industrial or economic developments are permitted by governments. Such habitat creation must be done sufficiently far in advance of the anticipated loss to enable shorebirds to transfer their feeding from the natural to the created mudflats. This poster provides an overview of a study examining colonisation of a newly

created mudflat by macro-invertebrates. The success of the attempt at mudflat creation has been assessed both by studies of invertebrates and by monitoring the use of the areas by birds. On the evidence from this study, creation of intertidal areas in mitigation for any lost nearby to industrial or other development should take place at least three years before the losses, in order to make the new areas profitable for feeding waterfowl.

Differences in the diet of adult Curlew Sandpipers in two different habitats during autumn migration on the Polish coast.

Dariusz Górecki

The stomach-flushing method has been used with success in many kinds of animals (fish, reptiles, amphibians and birds), and successfully applied to waders. I tried to examine the Curlew Sandpiper's *Calidris ferruginea* diet in the region of the Reda river mouth (Gulf of Gdańsk, Poland, 54°39'N, 18°30'E). The study was conducted during the autumn migration seasons 1998 – 1999. Birds caught in mist-nets and walk-in traps immediately underwent the stomach-pumping. All samples were preserved in 4% formaldehyde. For each bird also the sex (if possible), measurements (bill, tarsus and wing lengths), and weight and fat score were recorded. The contents of oesophagus and proventriculus were identified in laboratory using binocular and microscope. As the soft parts of food are quickly digested in birds, the identification of some type of prey was very difficult (for instance *Oligochaeta*).

To identify potential prey species, their abundance in the study area mudflats, and their size and composition, 345 samples were collected using the Eckman probing method. The samples were collected during the whole catching season from the end of June to mid-September. Due to the abundance of samples and a high number of potentially consumed invertebrates it was not possible to identify the prey items to species. Therefore, they were divided into several easily recognisable groups: *Corophium* sp., polychaetes, gastropods, oligochaetes, bivalves and Diptera larvae.

The differences in prey composition and selection of prey size were observed between two different closely situated habitats. In the first one – the Reda

river mouth, with many sandy islands and muddy lagoons, the most common items in guts were *Corophium* sp. and polychaetes (*Nereis* sp.) In the second one, the nearby ash dumps of the electric power plant, the most common items were larvae of *Chironomidae* (Diptera). Curlew Sandpipers preferred the second habitat – they foraged there at highest densities. The choice of foraging place was positively correlated with prey density.

Migration pattern of Curlew Sandpiper *Calidris ferruginea* in south Atlantic coast of Spain

Francisco Hortas

We used in this work the total numbers of Curlew Sandpipers *Calidris ferruginea* counted in an industrial saltpan and adjacent mudflats during an annual cycle situated in Cádiz Bay (southwest Spain). The main objective was to know the migration pattern of this species in this Atlantic region. We counted the Curlew Sandpiper during four consecutive years (103 counts between December 1985 and January 1990). More census effort was made in the postnuptial passage between end of July and 1st October during 1988 and 1989. In this period we counted the juveniles and adults present in the study area. According to the results, there were two peaks in migration: in April and August with a few birds in winter. These two peaks were well defined in time and suggest Cadiz Bay is an important refuelling area. No difference in timing was found between the postnuptial migration of the juveniles and adults. However, we found significant differences between years in juveniles. The results suggest that the migration pattern of juveniles and adults were different. On the other hand, the results suggest the hypothesis that a similar number of those birds, which migrate through the East Atlantic flyway to wintering areas in Africa, return by the same way to breeding areas. Ringing studies are now needed to clarify these ideas.

Biometrics and primary moult of the Grey Plover (*Pluvialis squatarola*) caught during autumn migration through the Gulf of Gdańsk (Poland).

Robert Krupa

The biometrics and the primary moult of the Grey Plover were studied at the Gulf of Gdańsk during autumn migration seasons 1983–1995 from mid-July to the end of September. In total, 403 birds were caught including 273 adults (95 females and 95 males). Adults had significantly larger wing length, total head length, bill and tarsus length than juveniles, although the two last parameters differed only slightly. In females, all the measurements except bill were significantly longer than in males. The body mass of the Grey Plover varied from 125 g to 300 g. Adults were on average significantly heavier than juveniles, also females weighed significantly more than males. Adults of the Grey Plover which migrated from the end of July to mid-August had significantly longer wings and bills than those which migrated between the second half of August and mid-September because females passed through earlier. Among the migrating adults, 19.5% (N = 251) had started the first to the third (the fourth in one case) primary moult. The percentage of males which started moult (26.1%, N = 92) was significantly larger than that of females (15.1%, N=93).

Choice of feeding sites by wintering Avocets in Guérande Peninsula

Sophie Le Dréan-Quénez' hdu, Chépeau, Y. & Mahéo, R.

Avocets Recurvirostra avoetia wintering at the Guérande Peninsula have a unique activity rhythm : they feed during the night on the salt pans and roost during the daylight on the mudflats. We have studied the characteristics of the salt pans visited by feeding Avocets in order to identify the reason of the choice. Three characteristics of the salt pans were studied : use (water stocking or water evaporation), the state of exploitation (exploited for salt production or no) and the water depth. We show that Avocets preferentially visit the pans used for water stocking, not exploited for salt production and with a water depth between 2 and 15 cm. We suggest that Avocets found in these pans a suitable sediment to allow their feeding technique and the presence of their main

prey, *Chironomidae* larvae. We suggest that Avocets feed on salt pans because of prey abundance and at night because they are less disturbed and perhaps because the prey activity is higher.

Gut parasite load of breeding Oystercatchers of Schiermonnikog

Sophie Le Dréan–Quénez' hdu, van Oers, K. & Heg, D.

We report a study of gut parasite load of Oystercatchers *Haematopus ostralegus* from Schiermonnikog (The Netherlands) in order to examine a possible relationship with breeding success. The method used is coprology, which is the research of parasite eggs in wader droppings. We distinguish between breeding birds and non breeding birds and for breeding birds (as done by Ens 1992). Leapfrog have a lower breeding success than resident. We show that the resident birds are less parasitised than leapfrog and non breeding birds. This fact may explain the difference in breeding success.

To where do the Redshanks *Tringa totanus* migrate after passing Gulf of Gdańsk in autumn?

Włodzimierz Meissner

Among Redshanks *Tringa t. totanus* appearing in Baltic region during autumn at least two migratory populations can be distinguished. The first, called 'southern', inhabit southern Scandinavia (up to about 60°N), southern and south-eastern Baltic coast, whereas 'northern' birds come from the Scandinavian mountains, northern Norwegian coast and Finland. Redshanks from the 'southern' population pass through the Baltic area earlier than 'northern' ones. Thus, the duration of autumn migration of this species is quite long. First migrants arrive at the Gulf of Gdańsk in the beginning of July and about the end of September the last ones depart. The highest number of Redshank in the Gulf of Gdańsk region was noted most often in September, whereas in inland western European their number rapidly decreases during August and September or even earlier. Analysis of direct ringing recoveries showed that Redshanks caught in the Gulf of Gdańsk in July and August (up to end of the second ten-day period) migrate in different directions. They are noticed in inland, Mediterranean and coastal areas

of the western Baltic, North Sea and Atlantic. Those from the last decade of August and from September were found almost exclusively along the Baltic, North Sea and Atlantic coasts. This fact explains the lack of September peak in Redshank numbers in western European inland. At the same time, when the September wave of 'northern' Redshank reaches the North Sea coast a huge number of Icelandic Redshank (*T. t. robusta*) also arrives there. That is why their appearance is difficult to notice using counts alone.

Recent status of southern subspecies of the Whimbrel *Numenius phaeopus alboaxillaris* in Russia and Kazakhstan

Vladimir Morozov

The southern subspecies of Whimbrel *Numenius phaeopus alboaxillaris* is one of the rarest and least known species of Palearctic wader. It was described by samples obtained at its wintering grounds in Eastern Africa. Its subspecies status was called in question in spite of significant differences in the colour of the plumage and breeding distribution. White axillaries, white rump and upper tail coverts are the main morphological differences of *N. p. alboaxillaris*. Despite the fact that *N. p. alboaxillaris* is considered to be bigger than other subspecies of Whimbrel, the differences in wing-length, bill length and tarsus length of birds between different Whimbrel subspecies are not significant. According to former studies the breeding range of *N. p. alboaxillaris* occupied forest-steppe and steppe from the Volga to Tobol Rivers and from Samara to Chelkar Lake (Kozlova 1962). Its breeding range had undergone drastic decline. It is likely disappeared from steppe located to the west of the Ural mountains before the 1950s. The last record of breeding was registered in Western Kazakhstan in 1985. However in 1996 *N. p. alboaxillaris* was not found within this area. Presently, the only breeding site is known. It was discovered in the steppe of Southern Ural in 1997 only. There were six pairs in 1996 and 11 pairs in 1997 observed within the area investigated. Apparently there are some other breeding sites of *N. p. alboaxillaris*, still unknown, since migrating birds were observed in different areas of Kazakhstan and Orenburg Region of Russia.

Unlike other subspecies of Whimbrel *N. p. alboaxillaris* breeds in flood-plain meadows and agricultural areas of river valleys. Within Russia, the areas suitable for breeding *N. p. alboaxillaris* are still preserved. Therefore the reduction in its numbers and breeding range can't be explained only by ploughing up of steppe and degradation of meadows. A more significant cause of the decline of *N. p. alboaxillaris* is the sharp increase in the aridity of climate, which has occurred over a vast area and probable deterioration of environmental conditions on the wintering grounds. However, this supposition needs to be verified. Recent number dynamics and the state of *N. p. alboaxillaris* species of Whimbrel are quite similar to ones of Slender-billed Curlew and Sociable Plover.

Interseasonal variability of biometric parameters in Wood Sandpiper *Tringa glareola*

Mateusz Sciborski

In years 1994 – 1997, research on the spring migration (from the turn of April to mid-May) of Wood Sandpiper *Tringa glareola* was carried on in the Mechelinki Meadows on the Gulf of Gdańsk coast (Poland) by the Waterbird Research Group 'Kuling'. In total, 784 birds were caught in walk-in traps and mist-nets, ringed and measured (total head, bill, tarsus and wing lengths, also body mass).

As a result of the two-way ANOVA (tested factors: year, pentade) the year appeared to be the factor influencing the variability of wing and tarsus lengths. Neither the pentade nor the interaction between both factors were significant. In the case of the wing, differences were found between years 1994 and 1996 (Tukey test, $p=0.009$), 1994 and 1997 ($p=0.002$). The mean values of tarsus length were significantly different between years 1994 and 1997 ($p=0.02$), 1995 and 1997 ($p=0.001$). This corresponds to the results obtained from the autumn migration of juvenile Wood Sandpipers through the Gulf of Gdańsk which also showed the influence of the year factor upon the presented biometric parameters.

Body mass was the most variable parameter. It showed significant differences between years, pentades and also the interaction between these

factors. The body mass (51–98 g, \bar{x} =68.9) was higher than in autumn (\bar{x} =59.8 g) which suggests different migration strategies before and after the breeding season. The body mass of spring–migrating Wood Sandpipers in other parts of Europe was also lower than that found at the Mechelinki Meadows (e.g. Camargue: 47–81 g, \bar{x} =61.9 g, Niedersachsen: 48–79 g, \bar{x} =61.5 g, Greece: 45–76 g, \bar{x} =58.1 g).

An evolutionary stable strategy for aggressiveness in feeding groups

Etienne Siro

In natural populations, individual strategies are influenced by the behaviour of conspecific animals. That is why a relevant way to study them is to use game theory. I present a general and individual–based game theoretical model which considers a flock of birds exploiting a food patch. The model predicts how the birds should adjust their level of aggressiveness to their environmental conditions. In accordance with behavioural observations on waders and passerines, the model shows that birds should be more aggressive with one another when density in the group is high and when prey are scarce. The model also predicts a positive influence of food energy value and handling time on aggressiveness in the group. Finally, the model predictions can be used to discuss the influence of aggressive behaviour on individual foraging success, interference and population dynamics.

Evolution de la population nicheuse d'Avocettes *Recurvirostra avosetta* de la région de la Baie de Somme

François Sueur & Patrick Triplet

Depuis sa première reproduction en Baie de Somme (Réserve Naturelle) en 1975, l'Avocette a connu une phase de croissance jusqu'en 1986, suivie par une décroissance pendant 10 années et une nouvelle phase de croissance depuis 1995. Au cours des dix années de décroissance, la population, soumise à une baisse des ressources trophiques et à une très forte prédation, a tenté de s'installer sur différents autres sites du littoral picard. Cependant, la production de jeunes à l'envol y était aussi faible que dans la Réserve Naturelle les années de faibles effectifs nicheurs. Ainsi, la sauvegarde d'un effectif important de couples nicheurs en Baie de Somme

passer soit par une meilleure gestion du site principal, dans la Réserve Naturelle, soit par la création d'une autre zone qui serait protégée et répondrait aux exigences écologiques de l'espèce.

Habitat selection by nesting plovers *Pluvialis fulva* in the southern tundra, Taimyr Peninsula

Tatiana Sviridova & Mikhail. Yu. Soloviev

Habitat selection by the Pacific Golden Plover *Pluvialis fulva* was studied during 1994–1998 in the southern tundra zone of Taimyr Peninsula. In total about 100 nests could be analysed on different habitat–scales, landscapes characteristics and in different seasons. In order to analyse habitat selection by Pacific Golden Plover several scales were taken:

- 1) Five types of the most widespread and generalised habitats are used for 'first–level' analysis of habitat selection for nest scrapes of plovers;
- 2) 'second–level' analysis are based on more detailed mapping of all habitats around the nests with approximate radius of 25m;
- 3) third type of analysis includes descriptions of flora on one square metre around nests.

Two different landscape types are used by Golden Plovers for nesting at the study area: flat terrace of Khatanga river and watersheds with rather steep slopes and flat tops. The habitat selection in these different kinds of landscapes are also analysed. In addition, there are also two main types of breeding season in the tundra with different conditions in the beginning of the nesting period: late and early spring. Late spring with a rather long snow melt could influence habitat selection by plovers as in the late years they should nest before the time when all potential habitats will be free from snow. A special comparison between late and early spring will be made. From preliminary results it seems that there are no large differences in habitat preference by the same birds (banded by colour rings) in different situations, but more careful analysis needs to be done. Overall, at first glance, it seems that large differences could be found in habitat selection for nests by Golden Plover on 'first–level' scale, but much less differences will be found when we try to compare on two levels with more detailed analysis.

North west Oléron island (France Atlantic coast) important wintering site for some waders: *Calidris alba*, *Arenaria interpres* and *Calidris maritima*

Jean Marc Thirion & Bernard Deceuninck

The interest of Oléron island coast for the waders is studied and the distribution and the evolution of each high tide roost is presented. The area was of national interest in mid–January 1998 for the following species: Ruddy Turnstone *Arenaria interpres* (n=847) 11% of the national wintering population (NWP), Sanderling *Calidris alba* (n=521) 5% NWP, Purple Sandpiper (n=18) 3,6% NWP and Common Ringed Plover (n=374) 3% NWP. The distribution of high tide roost is characteristic of the ecology of the different species. Ruddy Turnstone and Purple Sandpiper roost on rocky shores of the island. Sanderling and Common Ringed Plover use indifferently rocky and sandy shores. We can state that all species mainly use traditional high tide roost within the wintering period.

Spatial distribution of shorebirds in an estuary. A preliminary approach

Olivier Timsit & Jean–Claude Lefevre

To understand how six shorebird species share space in an estuary (west side of the bay of Seine, France) we have mapped their presence on the whole site (grid of 250x250 metres). Observations were reported at four different tide levels: high, ebb, low and flow tides. Preliminary results suggest a very strong variability with time, but a spatial analysis show some stability. The number of replicates needed to characterize the relationship between these spatial occurrences and main factors supposedly influencing the birds' distribution are discussed. GIS technologies are used to represent the impact of factors like human presence that were also recorded.

POSTER COMPETITION

Winner:

Spatial distribution of shorebirds in an estuary. A preliminary approach. *Olivier Timsit & Jean Claude Lefevre.*

Joint second:

Habitat selection by nesting plovers (*Pluvialis fulva*) in the southern tundra, Taimyr Peninsula. *Tanya Sviridova & Mikhael Soloviev*

Colourmarked Oystercatchers at the White Sea, Russia: Nine year old consequences of the Dutch visit. *Rob Lambeck, Elena Lebedeva and Vitaly Bianki.*

Avocet workshop in Vannes, the new IDEA

On the Monday after the WSG conference (27 September 1999) a workshop on population dynamics of Avocets *Recurvirostra avosetta* was held. The workshop was attended by 53 participants from 12 countries. Twelve speakers reviewed the status and the population development of Avocets breeding in 11 European countries, most of them in Western Europe. Comparisons between different countries revealed striking similarities in the population development of Avocets throughout Europe during this century. The most recent data, however, suggested diverging patterns of fluctuation, stabilisation, increase or even decrease in different regions. Habitat management in the widest sense and enhanced protection from persecution and disturbance seem to be factors responsible for at least some of the observed patterns. Habitats used by breeding Avocets differ greatly between countries. It is intended to publish the

results of the country-wise accounts in more detail in one of the next WSG Bulletins.

From the discussion following the presentations it became clear that there are still major gaps in the understanding of the functional processes behind the dynamics of the European Avocet population. One of the difficulties arises due to the lack of reliable estimates of adult and juvenile survivorship in Avocets. Another point poorly understood is the exchange rate between regional populations and how this influences the population dynamics. The latter point was identified as to be one which could possibly be tackled by common field activities in the next years.

A small working group was formed (see below) and a proposal for a new WSG project is currently being developed. The working title is International project on Dispersal in European Avocets (IDEA)

The aim of this project is to estimate the degree of dispersal between breeding sites of Avocets on a European scale. Both natal dispersal and breeding dispersal will be considered. The fieldwork will include an intensification

of colour ringing and improved searching for colour marked individuals at breeding sites. Colour-ringed Avocets can relatively easily be sighted on breeding grounds so that a coverage of a significant percentage of Avocet colonies in many countries can be achieved. For this the help of many volunteers is needed. Volunteers feeling able to check Avocet colonies in their regions should contact one of the members of the Avocet working group:

Hermann Hötter, FTZ, Univ. Kiel, Hafentörn, D-25761 Büsum, Germany
Phone: ++49 4834 604283, e-mail: hhoetker@ftz-west.uni-kiel.de

Meinte Engelmoer, Bentismaheerd 39, 9736 EC Groningen, The Netherlands.
Phone: ++31 50 5421158, e-mail: m.engelmoer@worldonline.nl

Guillaume Gélinaud, SEPNEB, Réserve Naturelle des Marais de Séné, Brouel-Kerbihan, F-56860 Séné, France
Phone: ++33 297 669276, e-mail: sepnb.sene@wanadoo.fr

Gonzalo Munoz Arroyo, Dept. of Animal Biology, Univ. of Cadiz, Faculty of Marine Sciences, P.O. Box, 11510 Puerto Real, Cadiz, Spain
Phone: ++34 956 016000, e-mail: gonzalo.munoz@uca.es

WSG ANNUAL GENERAL MEETING 2000 September 8th–11th, 2000, Norwich, UK

All WSG members are invited to revisit the Group's roots at the turn of the Millennium. The conference will take place at the University of East Anglia, between Friday 8 and Monday 11 September 2000. Norwich is close to the Wash, the premier wintering wader site in the United Kingdom, and the North Norfolk Coast, two sites that hold 430,000 waterfowl between them.

The Conference's theme is "Counts and marking – past, present and future" and so we would like to encourage people from all over the world to participate. On Saturday, the opening session will be on ringing and we would like to include talks which highlight what has been learned during the last thirty years and the priorities for the next thirty years. The second session aims to describe how past counts have been used and how new techniques and perhaps wider coverage will improve our knowledge of wader population dynamics. In the third session we would like examples/suggestions of how integrated studies that make use of marked birds and counts can improve our understanding of wader behaviour, phenology, population dynamics, as we prepare to face the challenges of the new Millennium. We plan to invite keynote speakers to sum up each of the three sessions.

The Sunday sessions will be more general and we would encourage people to submit talks on any wader studies in which they are involved. In the afternoon participants will be given the choice of two excursions. One will visit two RSPB reserves on the Wash, Snettisham & Titchwell, at a time of the year when an impressive number of passage birds should be present. The other will travel further south, into Suffolk to visit Breckland, one of the last strongholds of the Stone Curlew in England. On Monday, the workshop will cover the likely effects of Global Climate Change on wader populations. This should follow on nicely from the main Conference theme as climate change will probably provide a major impetus for wader research over the next thirty years.

Norwich Airport can be reached by plane directly from Aberdeen, Amsterdam, Edinburgh, Manchester and Paris. Alternatively, you can fly into one of the London airports and travel on by road and train from there. London Luton and London Stansted are both within three hours of Norwich by road. Frequent coach and train services run from central London if you are flying into London Gatwick or London Heathrow airport. Norwich is within three hours of central London by train. There are also good train and coach connections with other large UK cities. A regular fast ferry service runs from Hoek van Holland to Harwich, which is also within reasonably easy reach by road and rail.

The Organising Committee looks forward to seeing you all. Encourage your friends and colleagues to come and help us make this a Millennium Conference to remember! More detailed information will be supplied in the April 2000 issue of the Wader Study Group Bulletin. For further information please contact Mark Rehfish, BTO, The Nunnery, Thetford, IP24 2PU, UK. Tel: 0044 1842 750050; Fax: 0044 1842 750030, e-mail: mark.rehfish@bto.org.