

## REFERENCES

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- J.P. Myers, *Academy of Natural Sciences, 19th and the Parkway, Philadelphia, PA 19103, USA.*

## ABSTRACTS OF PAPERS PRESENTED AT THE AMERICAN ORNITHOLOGISTS' UNION MEETING, TEMPE, ARIZONA, 1985

### Seasonal changes in prolactin and luteinizing hormone in the Spotted Sandpiper.

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Prolactin (Prl) and luteinizing hormone (LH) were analyzed in plasma samples obtained serially from individuals across different stages of the breeding season. Males tended to have higher plasma Prl levels than females. Prl was significantly elevated in both sexes by the first few days of incubation. In males Prl continued to rise during incubation. Higher levels of Prl in males than females, especially late in incubation, reflects the greater contribution of males to incubation. LH declined markedly in males and females from prelaying to early incubation. There was a significant negative correlation between Prl and LH among males, especially from the prelaying to early incubation phases of the season. There was no such correlation among females.

### Variable mating strategies of monogamous Piping Plovers (*Charadrius melodus*) breeding in a changing environment.

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Mate choice, breeding site fidelity and reproductive success were monitored for four years on individually marked Piping Plovers at two sites in Manitoba. Frequent nest destruction by storms, predators and humans on Lake Manitoba sand beaches and West Shoal Lake alkali flats facilitated frequent re-nesting opportunities. Following nest loss, males remained on territories significantly more often than leaving, while females dispersed to one of three local sites. Both sexes chose new mates significantly more often than remain with old mates. With the exception of one polyandrous female, all birds were monogamous. Perennial monogamy, however, was observed in less than 10% of the pairs. Other studies of Piping Plovers breeding in less variable habitat have not reported intraseasonal mate-switching. Comparison of reproductive success between individuals utilizing different strategies will be made.

### Monogamy in Killdeer: Do the sexes invest equally in parental care?

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Evolution has presumably resulted in individuals exhibiting optimal strategies of allocating time to energy demanding and

obtaining activities, strategies which can be measured in the time-activity pattern of an individual. Trivers (1972) predicted that, for monogamous bird species, females should invest more in parental effort than males. If sexes have different strategies to maximize fitness, then time and energy budgets should reflect these differences. More than 450 hours of time-activity data were collected during 1984/5 for more than 20 breeding Killdeer. These data have been used to generate time activity budgets in terms of sex and stage of reproduction. In addition, a set of bird removal experiments were also carried out. Four males and four females were removed and the time-activity budgets of the remaining parent were assessed. Initial results indicate that males invest more in parental care than females. Males 'injury feign' towards potential predators more often and more intensely than females. For both sexes the intensity of this display varied with the type of predator, the predator/offspring distance, and offspring age. The conditions favoring high males parental care are discussed.

### The impact of oilfield facility density on shorebirds, Prudhoe Bay, Alaska.

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Densities of representative shorebird species were estimated in the Prudhoe Bay Oilfield and compared to densities predicted from habitat availability. Shorebird densities decrease with increasing density of oilfield development and human activity. A significant, negative correlation was shown between shorebird densities and a measure of oilfield facility density. The effect of increased facility density may be due to subtle impacts associated with a single facility that intensify as the distance between facilities decreases. The results of this study demonstrate an indirect effect of large-scale development in the wetlands of the Alaskan North Slope that extends beyond direct habitat loss due to facility placement. This effect may be minimized by consolidating oilfield facilities and minimizing human activity and disturbance.

### Sex ratios, intrasexual competition, and polyandry in Wilson's Phalarope (*Phalaropus tricolor*).

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I calculated Operational Sex Ratios for nonterritorial, sex-role reversed Wilson's Phalarope using data from nest initiations and daily censuses. During the 2-month breeding season sex ratios began strongly female-biased, approached unity as most males arrived, and became female-biased again as females

re-entered the reproductively active population and males incubated. The intensity of female-female competition for mates was closely tied to the Operational Sex Ratio. Early nesting females completed their first clutch when sex ratios and the intensity of competition for mates was most favorable for obtaining a second mate. The incidence of polyandry I recorded was low owing to the high mobility of females that had completed their first clutch.

The social organization of wintering Killdeer flocks: There's no place like home.

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Resident Killdeer are joined by juveniles and migrants to form winter flocks. Analysis of behavioral and census data indicated resident Killdeer maintained both strong pair-bonds and site fidelity during the winter. Summer neighbors fought strenuously on the few occasions they were in the same flock. Residents dominated nonresidents, and birds

which initiated aggressive encounters won overwhelmingly. No banded offspring were observed in any flock.

Between chaos and order: The structure of Sanderling winter populations.

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What constitutes a nonbreeding population? Without constraints on individual movement imposed by a nest and young, nonbreeding populations might range between two logical extremes: (1) structured, cohesive local populations arrayed discretely over space vs. (2) chaotically mixed, temporary aggregates whose momentary composition varies with the movements of individual birds. I examined the spatial and temporal limits of a Sanderling population in central California during the 1979-80 to 1984-85 winters. Intra-year wandering up to 30 km from the home estuary occurs regularly during some periods of the year but almost no permanent intra- or inter-year dispersal takes place. Sanderlings wintering in this region thus lie near the first extreme.

## STUDIES OF GREENSHANKS IN SOUTHERN AFRICA

by A.J. Tree

The aim of this article is to announce and describe a small-scale colour ringing study being made on Greenshanks *Tringa nebularia* in the Bathurst district of the eastern Cape Province in South Africa; in addition, further work carried out in the Harare area of Zimbabwe prior to 1984 is reported. Until very recently it seemed most unlikely that west European workers would come into contact with any of the birds from this study but a colour-ring sighting in central France of a bird ringed in Zimbabwe has shown that this population does not migrate only through eastern Europe.

The Greenshank is a widespread and relatively common non-breeding visitor to southern Africa with largest concentrations found in coastal regions (Tree 1979). The first adults appear in late July, indicating very rapid movement from their breeding grounds, but do not normally reach the south coast until about the middle of August. Birds of the year begin to arrive in September but mainly from early October onwards. Return migration of south coast birds takes place mainly in the last ten days of March and the first few days of April leaving only first year birds, many of which remain throughout the southern winter. The very considerable body-mass gains made prior to departure in March suggest that the return movement is very rapid with birds either stopping off in the rift valley lakes or continuing straight through to the Mediterranean; this depends on whose formula one uses! (Tree loc. cit.).

### RINGING

It is difficult to catch more than a few Greenshanks as they generally congregate in relatively small flocks, move to roost sites after dark and move quickly elsewhere if disturbed. Good netting sites are found only occasionally. Two such sites are at Rainham Dams, outside Harare (operable mainly August till early December), and the Blue Lagoon at Port Alfred. Both these localities are primarily roost sites, with few feeding birds present during the day. Birds are caught at

night in single-shelf mist-nets set about 0.6m over water and only very occasionally by the torch and hand-net method. Catches have varied from none (quite usual) to as many as 17 birds (an absolute freak) per night.

Incoloy rings of 5.25mm diameter are placed on the right metatarsus. These rings, although extremely durable, are very difficult to see in the field. DARVIC colour rings are placed on either left, right or both tibiataarsi. In Zimbabwe an individual colour code was used from July 1976 until January 1981 when results indicated that I was wasting both my time and my money. From October 1981 to January 1983 birds were given only a site-specific colour-coding. During a holiday to Port Alfred in December 1977 I started giving birds there their own individual colour-ring combinations, since a local ornithologist was keen to maintain observations for me. More birds were colour-ringed in December 1980 and from September 1983 onwards.

The colours used so far have been red, yellow, black, bright green and blue and it is intended to add orange and white in the forthcoming season. The first four colours have lasted for seven seasons but blue proved too difficult to determine at a distance, and also faded to a greyish colour rather quickly.

### RESULTS

The results from Zimbabwean ringing were almost totally negative and only one bird was subsequently resighted in the same area, almost exactly a year later. However, it is from this ringing that a bird was subsequently seen at Port Alfred almost five years later. Even more exciting is the sighting six years later of one of these birds in central France. This was a most surprising sighting, since I had assumed that our southern African birds were of a much more easterly origin.

The results from Port Alfred have been quite different as this site is at the end of a