Diet of Sanderlings at Punta Norte, Península Valdés, Argentina

MARÍA DE LOS ÁNGELES HERNÁNDEZ & LUIS OSCAR BALA

Centro Nacional Patagónico (CONICET) Boulevard Brown 3500 U9120ACV Puerto Madryn Chubut, Argentina
marianh@cenpat.edu.ar

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We describe the diet and food resource available to Sanderlings *Calidris alba* at Punta Norte, Península Valdés, Argentina. Fourteen potential prey-types were identified of which the most abundant was the southern mussel *Perumytilus purpuratus*, followed by clams *Lasaea* sp. and different kinds of crustacean: stomatopods, the isopod Exosphaeroma sp. and several amphipod spp. However, despite their abundance, none of the molluscs were taken by Sanderlings. Seventy Sanderling droppings were analyzed. These contained remains of five prey species: the isopod *Exosphaeroma* sp. (in 49% of droppings), several unidentified amphipod spp. (39%), the crab *Cyrtograpsus affinis* (31%), the polychaete *Laeonereis acuta* (13%), and various unidentified insects (1.5%). The droppings contained a mean of 1.6 individuals of *Exosphaeroma* sp. with an average length of 6.1 mm (range: 5.0–8.1 mm). This diet is similar in terms of the taxonomic groups included to that recorded for Sanderlings at other stop-over sites. When the diet is compared with the food on offer, it appears that the main components are highly mobile prey consistent with the Sanderling's usual strategy of visual prey detection.

INTRODUCTION

During the non-breeding season, the diet of the Sanderling is recorded as consisting of the molluscs, polychaetes and crustaceans that inhabit the intertidal zone (Myers *et al*. 1980, Canevari *et al.* 2001, Petracci 2002). The aim of this study was to describe the food availability and diet of the Sanderling during the non-breeding period at Punta Norte, Península Valdés, Argentina.

STUDY AREA AND METHODS

The study was conducted at Punta Norte (42°04'S, 63°45'W), the extreme northeast point of Península Valdés, Patagonia, Argentina. This area is characterized by boulder beaches and rocky shores. Sanderlings are regular on passage at Punta Norte in March and April (Bala *et al.* 2002).

Fieldwork was carried out in April 2000. To assess the food availability for the birds, the abundance and composition of the intertidal invertebrates were measured. We took benthic samples by scraping all organisms off the rocks within six squares of 15 × 15 cm. All prey items collected were sorted to species and counted. We measured the shell length of the molluscs, and the length of the crustaceans and polychaete worms with calipers to the nearest 0.1 mm in the laboratory.

To assess the diet of the birds, we collected droppings of Sanderlings. Samples were processed as described by Dekinga & Piersma (1993). Droppings were washed through 600 µ and 300 µ mesh sieves and remaining structures were examined with a magnifying glass or stereomicroscope. We identified and counted the number of structures per dropping, and determined the proportion of droppings in which a prey species occurred (proportional occurrence).

Some structures also permitted a biomass equivalent analysis of the prey. To do this, we measured the telson heights of the isopod *Exosphaeroma* sp. and the mandible heights of the polychaete worm *Laeonereis acuta* found in the droppings. Samples of the isopods and worms were collected from the beach, and these same structures as well as the length of each animal were measured. They were then dried in an oven at 85°C for 48 hours after which they were weighed individually to determine dry mass. For *L. acuta*, dry mass was transformed to ash-free dry mass (AFDM) by multiplying dry mass by 0.85. This factor was estimated from samples of dried worm that had been weighed, incinerated for 5 h at 550°C and then reweighed to determine ash mass and by subtraction AFDM. No similar factor was available for the isopod. We then estimated the length and mass/biomass of the ingested prey using the following regression models:

Isopod length (mm) = 3.0277 * telson height + 0.875
R–Sq = 94%, N = 34

Isopod dry mass (mg) = 0.019 * Isopod length $^{3.2299}$
R–Sq = 0.96, N = 8 (Fig. 1)

Worm length (mm) = 80.657 * mandible height –14.17
R–Sq = 90%, N = 30

Worm biomass (mg AFDM) = ((0.0144 * worm length $^{1.3948}$) *0.85)
R–Sq = 67%, N = 30 (Fig. 2)

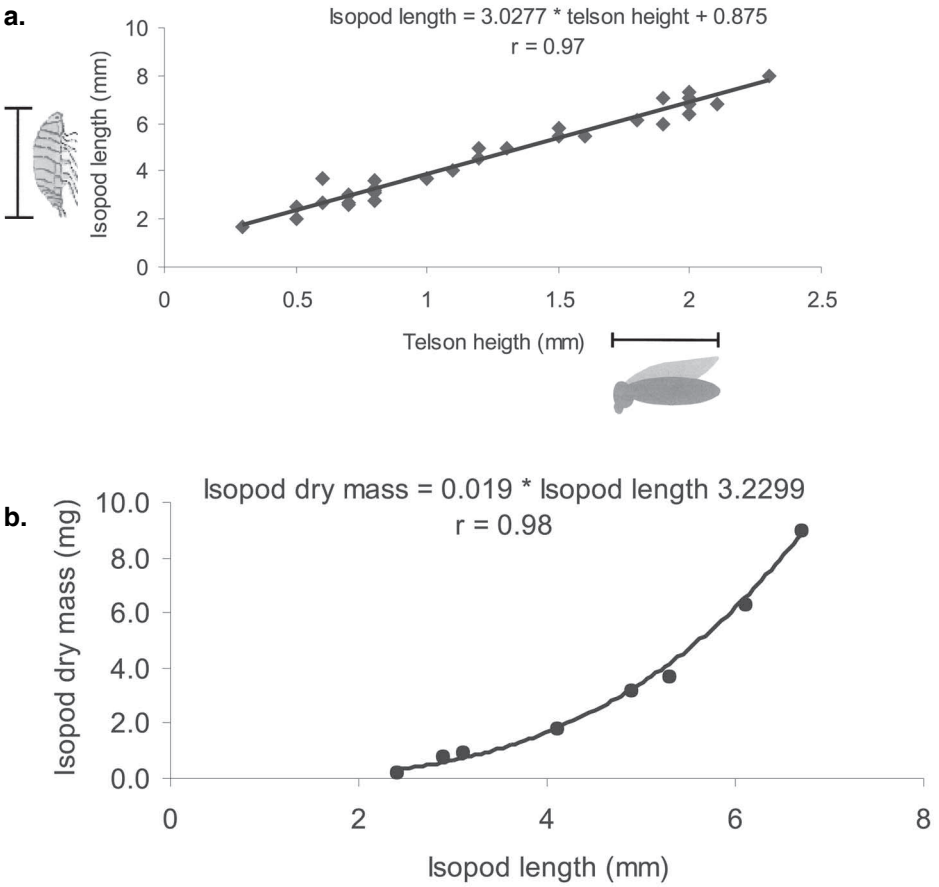

Fig. 1. (a) Estimation of the length (mm) of the isopod *Exosphaeroma* sp. from telson height (mm). **(b)** Estimation of isopod dry mass (mg) from isopod length (mm).

RESULTS

Benthic sampling determined that there were 14 invertebrate species that were potentially available as prey for Sanderlings (Table 1). However, analysis of droppings (N = 70) revealed that only five of these are taken by Sanderlings. The species with the highest frequency of occurrence in the droppings was the isopod *Exosphaeroma* sp. (49%), followed by different unidentified amphipods (39%), the crab *Cyrtograpsus affinis* (31%), the polychaete *Laeonereis acuta* (13%), and unidentified insects (1.5%).

In the droppings sampled, 109 individual *Exosphaeroma* sp. were found (1.6 per dropping) and 20 individual *L. acuta* (0.3 per dropping). We reconstructed the original mass of these two prey species only. The average length of the isopods ingested was 6.1 mm (SD±1.6, N = 109) and the average dry mass was 10.1 mg (SD±8.4, N = 109). The average length and the average dry biomass of the polychaetes ingested were 70.3 mm (SD±16.0, N = 20) and 4.67 mg AFDM (SD±1.47, N = 20).

Table 1. Invertebrate fauna of Punta Norte. Values are mean densities (individuals/m^2) and standard deviations of six samples.

Species		Mean	SD
Molluscs	*Brachidontes rodriguezi*	14.8	25.6
	Darina solenoides	7.4	12.8
	Mytilus edulis	14.8	25.6
	Lasaea sp.	1,546.6	496.6
	Perumytilus purpuratus	10,123.2	1,733.3
Crustaceans	Amphipods sp.	244.2	230.7
	Anthuridos sp.	37.0	64.1
	Cyrtograpsus affinis	236.8	89.7
	Exosphaeroma sp.	2,301.4	1,064.8
	Ostracods	192.4	333.2
	Pseudosquilla sp.	9,035.4	6,225.3
Gasteropods	*Fisurella radiosa*	7.4	12.8
Polychaetes	*Laeonereis acuta*	7.4	12.8
Insects	insect larvae	1,879.6	413.1

DISCUSSION

The Sanderling diet we recorded is similar in terms of taxonomic groups to that recorded at other stop-over sites: isopods, polychaetes, amphipods and insects (Humphrey *et al.* 1970, Harrington *et al.* 1986, Myers *et al.* 1980, Evans *et al.* 1980, Petracci 2002). Insects are only occasionally taken by Sanderlings, their occurrence mainly coinciding with periods of high temperatures and offshore winds that blow insects from inland to the coast.

It is strange that despite the high availability of the mussel *Perumytilus purpuratus*, it is not included in the diet, as it was at Monte Hermoso, Buenos Aires (Petracci 2002). A probable explanation is that it has low profitability because of the metabolic cost of crushing and processing the shell,

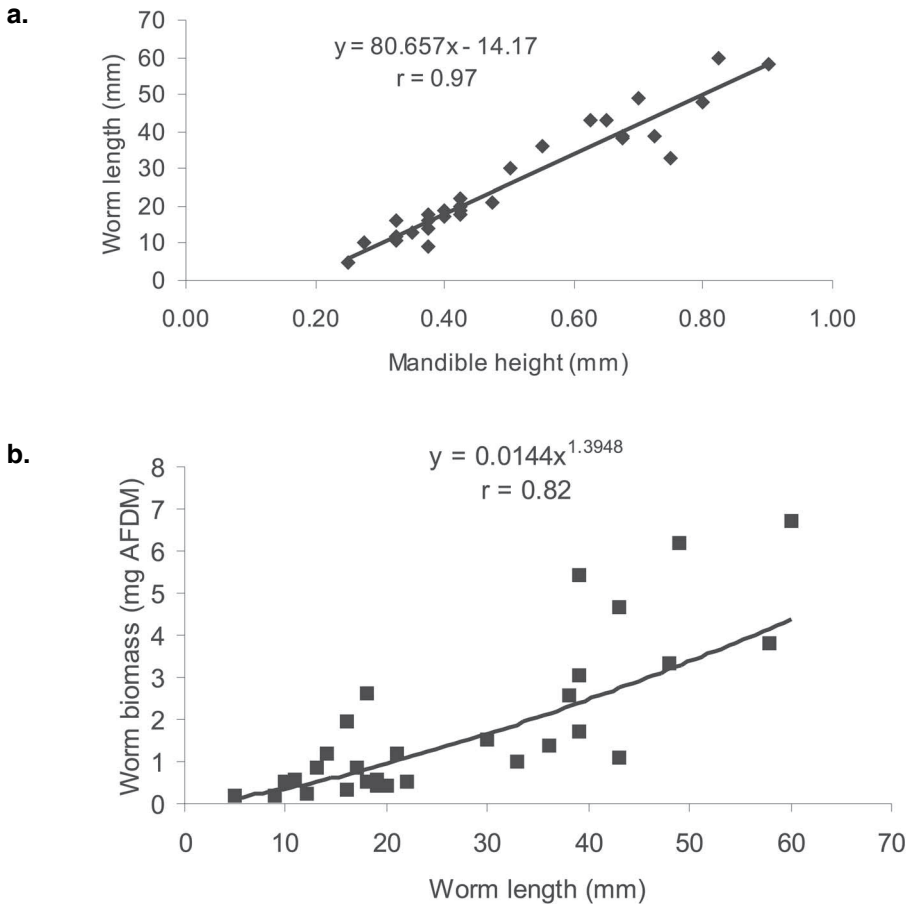

Fig. 2. (a) Estimation of the length (mm) of the polychaete worm *Laeonereis acuta* from mandible height (mm). **(b)** Estimation of worm biomass (mgAFDM) from worm length (mm).

making other prey such as isopods – despite being smaller – more profitable.

When the diet we determined is compared with the food on offer, it appears that the main components – at least on the rocky shores of Península Valdés – are highly mobile prey, consistent with the Sanderling's usual strategy of visual prey detection (Petracci 2002).

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REFERENCES

Bala, L.O., D´Amico, V.L. & Stoyanoff, P. 2002. Migrating shorebirds at Península Valdés, Argentina: Report for the year 2000. *Wader Study Group Bull.* 98: 6–9.

Canevari, P., Castro, G,. Sallaberry, M. & Naranjo, L.G. 2001. *Guía de los chorlos y Playeros de la Región Neotropical.* American Bird Conservancy. WWF–US. Humedales para las Americas y Manomet Conservation Science. Asociación Calidris, Santiago de Cali, Colombia.

Dekinga, A. & Piersma, T. 1993. Reconstructing diet composition on the basis of faeces in a mollusc-eating wader, the Knot *Calidris canutus*. *Bird Study* 40: 144–156.

Evans, P.R., Breary, D.M. & Goodyer, L.R. 1980. Studies on Sanderling at Teesmouth, NE England. *Wader Study Group Bull.* 30: 18–20.

Harrington, B.A., Zuquin Antas, P.T. & Silva, F. 1986. Northward shorebird migration on the Atlantic coast of Southern Brazil. *Vida Silvestre Neotropical* 1: 45–54.

Humphrey, P.S., Bridge, D., Reynolds, P.W. &. Peterson, R.T. 1970. *Birds of Isla Grande (Tierra del Fuego)*. Smithsonian Institution, University of Kansas Museum of Natural History, Washington D.C.

Morrison, R.I.G. 1984. Migration systems of some New World shorebirds. In: *Behaviour of Marine Animals* (eds J. Burger & B.L. Olla) Vol. 6. Shorebirds: Migration and Foraging Behaviour. pp. 125–202. New York, Plenum Press.

Myers, J.P., Sallaberry, M., Ortiz, E., Castro, G., Gordon, L.M., Maron, J.L., Schick, C.T., Tabilo, E., Antas, P.T.Z. & Below, T. 1990. Migration routes of new world Sanderling (*Calidris alba*). *Auk* 107: 172–180.

Myers, J.P., Williams, S.L. & Pitelka, F.A. 1980. An experimental analysis of prey availability for Sanderling (Aves: Scolopacidae) feeding on sandy beach crustaceans. *Can. J. Zool.* 58: 1564–1574.

Petracci, P. 2002. Diet of Sanderling in Buenos Aires Province, Argentina. *Waterbirds* 25: 366–370.