

FEATURE ARTICLES

**SPATIAL AND TEMPORAL VARIATION OF DIET WITHIN A PRESUMED  
METAPOPOPULATION OF ADÉLIE PENGUINS**

DAVID G. AINLEY<sup>1,6</sup>, GRANT BALLARD<sup>1,2</sup>, KERRY J. BARTON<sup>3</sup>, BRIAN J. KARL<sup>3</sup>,  
GREG H. RAU<sup>4</sup>, CHRISTINE A. RIBIC<sup>5</sup> AND PETER R. WILSON<sup>3</sup>

<sup>1</sup>*H.T. Harvey and Associates, 3150 Almaden Expressway, Suite 145, San Jose, CA 95118*

<sup>2</sup>*Point Reyes Bird Observatory, 4990 Shoreline Highway, Stinson Beach, CA 94970*

<sup>3</sup>*Landcare Research New Zealand Ltd., Private Bag 6, Nelson, New Zealand*

<sup>4</sup>*Institute of Marine Science, University of California, Santa Cruz, CA 95064*

<sup>5</sup>*USGS Wisconsin Cooperative Wildlife Research Unit, Department of Wildlife Ecology,  
University of Wisconsin, Madison, WI 53706*

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<sup>6</sup>E-mail: [dainley@penguinscience.com](mailto:dainley@penguinscience.com)

*Abstract.* We investigated temporal and spatial variability in the diet of chick-provisioning Adélie Penguins (*Pygoscelis adeliae*) breeding at all colonies within one isolated cluster in the southwestern Ross Sea, Antarctica, 1994–2000. We wished to determine if prey quality explained different population growth and emigration rates among colonies. Diet composition was described both by conventional means (stomach samples) and by analysis of stable isotopes in chick tissues (toenails of individuals killed by skuas [*Stercorarius maccormicki*]). Diets were similar among the four study colonies compared to the disparity apparent among 14 widely spaced sites around the continent. Calorimetry indicated that fish are more energetically valuable than krill, implying that if diet varied by colony, diet quality could attract recruits and help to explain differential rates of colony growth. However, a multiple-regression analysis indicated that diet varied as a function of year, time within the year, and percent of foraging area covered by sea ice, but not by colony location. Stable isotopes revealed similarity of diet at one colony where conventional sampling was not possible. We confirmed that sea ice importantly affects diet composition of this species in neritic waters, and found that (1) quality of summer diet cannot explain different population growth rates among colonies, and (2) stable isotope analysis of chick tissues (toenails) is a useful tool to synoptically describe diet in this species over a large area.

*Key words:* Adélie Penguin, Antarctic, colony choice, diet variation, diet quality, *Pygoscelis adeliae*, stable isotope.