

Jean-Baptiste Thiebot

National Institute of Polar Research, Japan

Jellyfish and other gelata as food for four penguin species in the southern oceans – insights from predator-borne videos

Thiebot JB, Arnould JPY, Gómez Laich A, Ito K, Kato A, Mattern T, Mitamura H, Noda T, Poupart T, Quintana F, Raclot T, Ropert-Coudert Y, Sala JE, Seddon P, Sutton G, Yoda K, Takahashi A.

National Institute of Polar Research, Tokyo, Japan; School of Life and Environmental Sciences (Burwood Campus) Deakin University, Geelong, Australia; Instituto de Biología de Organismos Marinos (IBIOMAR-CONICET), Puerto Madryn, Argentina; Department of Polar Science SOKENDAI (The Graduate University for Advanced Studies), Tokyo, Japan; Centre d'Études Biologiques de Chizé UMR 7372 CNRS et Université de La Rochelle, Villiers-en-Bois, France; Department of Zoology University of Otago, Dunedin, New Zealand; Graduate School of Informatics Kyoto University, Kyoto, Japan; Institut Pluridisciplinaire Hubert Curien Département Écologie Physiologie et Éthologie Université de Strasbourg CNRS UMR7178, Strasbourg, France; Graduate School of Environmental Studies Nagoya University, Nagoya, Japan

Jellyfish and other pelagic gelatinous organisms (“gelata”) are increasingly perceived as an important component of marine food webs, including in the southern oceans, but remain poorly understood. Their importance as prey in the oceans is extremely difficult to quantify due in part to methodological challenges in verifying predation on gelatinous structures. Miniaturized animal-borne video data loggers now enable feeding events to be monitored from a predator’s perspective. Over the past years, we gathered a substantial video dataset (over 350 hours of exploitable footage) from 106 individuals spanning four species of non-gelatinous-specialist predators (penguins), across regions of the southern oceans (areas south of 30°S). Among other prey, we documented nearly 200 cases of targeted attacks on carnivorous gelata (Scyphozoans and Ctenophores) by all four species, at all seven studied localities and during different years; however the videos never showed the penguins attacking gelatinous herbivores (Salps). Our findings emphasize that gelatinous organisms actually represent a widespread but currently under-represented trophic link across the southern oceans, even for endothermic predators, which have high energetic demands. Notably, the videos show that penguins captured gelata even when other prey were locally available. Hypotheses about why penguins would capture these energy-poor prey are discussed. Over the two upcoming seasons (2017/2018 and 2018/2019), video loggers will further be deployed on penguins at a number of localities around the Antarctic continent, to test for potential differences in this behaviour across regions, with a special emphasis on the importance of salps. The use of modern technological tools, such as animal-borne video data loggers, will help to correctly identify the ecological niche of gelata.