

1. Record Nr.	UNINA9910763599503321
Autore	Ainley David G
Titolo	The aquatic world of penguins : biology of fish-birds // David G Ainley, Rory P Wilson
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2023
ISBN	3-031-33990-8
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (xxii, 567 pages) : illustrations (chiefly color)
Collana	Fascinating Life Sciences, , 2509-6753
Altri autori (Persone)	WilsonRory P
Disciplina	598.47
Soggetti	Penguins
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	<p>PREFACE AND ACKNOWLEDGEMENTS -- SECTION I – IN THE BEGINNING -- CHAPTER 1. WADING IN INTRODUCTION TO THE FISH-BIRD -- General Discussion of Penguins and Substance of the Book -- An Impressive Number of Penguin Species: Evolution of Their Unique Capabilities -- Penguin Species Radiation and the Ontogeny of Their Watery World -- Penguin Evolution: Body Size and Climate -- Penguin Evolution: Radiation into Vacant Niches -- Penguin Evolution: Body Size and Crossing the Sea-Land Boundary -- CHAPTER 2. LAND AHOY! A TIRESOME BUSINESS -- Crossing the Land-Ocean Interface is Affected by Body Size -- Why and How Often do Penguins Come Ashore? -- Tying Land-life to the At-sea Life of Fish-Birds: Foraging and Breeding -- Success Vary with Prey Availability -- Molt Necessary, Brief Respite from the Sea -- SECTION II – PENGUIN MARINE HAUNTS AND FOOD HABITS -- CHAPTER 3.FISH-BIRDS AT HOME IN THEIR OCEAN HABITATS -- Oceanographic Fronts and Water Masses Important to Penguins: General Discussion -- Penguins Require High Productivity Water Masses -- Large Scale: Oceanographic Boundaries and At-sea Distributions of Penguins -- Southern Boundary of the Antarctic Circumpolar Current -- Emperor and King penguins -- Adélie and Chinstrap penguins -- Antarctic Polar Front and Subantarctic Front -- Gentoo and Yellow-eyed penguins -- Macaroni and Royal penguins -- Northern and Southern Rockhopper, Fiordland, Snares penguins -- Subtropical Front and Continental Boundary Currents -- Galápagos, Humboldt, Magellanic,</p>

African penguins -- Little penguins -- Meso- and Small-Scale Ocean Processes Facilitating Penguin Exploits -- Island wakes -- Headland wakes -- Shelves and banks -- Submarine canyons -- Shelfbreak fronts -- Marginal ice zones -- Thermo-/haloclines -- CHAPTER 4. SEA FOOD THE FISH-BIRD MENU -- General Considerations -- Diet Quality: Survival in Cold Water -- Energy density of prey -- Prey size may or may not differ by penguin size -- Prey availability -- Diet Comparison among Penguin Species -- Polar/subpolar, mesopelagic penguins -- Subpolar, demersal/benthic, continental-shelf penguins -- Temperate, upper water column, continental-insular shelf penguins -- Polar, upper water column, continental shelf/slope penguins -- Subpolar, upper water column, continental slope/pelagic penguins -- Polar, upper water column, continental slope/pelagic penguins -- CHAPTER 5. ECOLOGICAL CONSEQUENCES OF DIET COMPOSITION -- Intraspecific Competition among Penguins -- Foraging Range is Key: General Discussion -- Penguin Species' Central-Place Foraging Range Patterns -- Sex Differences in Foraging -- Interspecific Competition Involving Penguins -- Penguins Eat A lot! -- Competition between Penguin Species -- Competition between penguins and other seabirds -- Competition between penguins and marine mammals -- Competition between penguins and industrial fisheries -- SECTION III – THE HARDWARE OF A FISH-BIRD -- CHAPTER 6. THE SLIPPERY SHAPE, HOT AIR AND THE POWERHOUSE – HOW FISH-BIRDS SWIM -- Water – Hard Taskmaster -- The Four Forces Relevant to Penguins -- Vertical Forces – Weight and Upthrust -- Buoyancy: How Much Air Do Penguins Hold? -- Buoyancy and Bergmann's Rule revisited -- Horizontal Forces: Drag -- The Interplay of Drag and Upthrust in Gliding Penguins -- The Drag Devil is in the Detail -- The Penguin Powerhouse -- How Penguins Swim -- The Effect of Upthrust and Body Angle on Penguin Thrust and Lift Forces -- Top Speeds; Power and Upthrust -- The Energy Costs of Swimming -- General considerations -- Specific considerations -- 'Sensible' Swim Strategies and Costs of Transport -- Cruising speed and integrating speed with the cost of transport, -- and beyond -- CHAPTER 7. HOT PENGUINS COLD WATER -- Resting and Floating Penguins -- The Metabolic Rate of Floating Penguins -- Patterns of Heat Loss to the Sea -- Overall Body Insulation/Conductance -- The Nature of Penguin Insulation -- Active Penguins -- Activity Produces Heat -- Greater Depths Impose a Higher Heat Tax -- Consuming Prey Imposes a Heat Tax -- Embracing The Fish in the Fish-bird -- CHAPTER 8. FISH-BIRDS – THE INSIDE STORY -- Diving Physiology -- Surface issues – Uptake of oxygen -- Oxygen Management Underwater -- Role of the Air Spaces -- Gas Exchange to Body Tissues -- The Aerobic Dive Limit and Beyond -- The Importance of Size in Dive Performance -- Duration -- Depth -- Penguins Under Pressure – Beating the Squeeze and the Bends -- Barotrauma -- Beating the Bends -- A Gut Reaction in Fish-Birds -- Gastric Emptying -- Rotting Food -- The Eyes Have It -- SECTION IV – THE SOFTWARE OF FISH-BIRDS -- CHAPTER 9. EMBRACING THE DEPTHS - THE PENGUIN DIVE -- Submergence -- The time underwater – basic dive descriptors -- Dive profiles -- Dive distance-depth profiles -- Dive aspect ratios -- Horizontal dive directionality/tortuosity -- The Multifunctionality of Dives -- Basic dive types -- T-dives for travelling -- V-dives (water column assessment) -- P-dives (parabolic – prospecting with no prey capture) -- Po-dives (parabolic dives with circular trajectory) -- U-dives (depth-directed prospecting) -- W-dives/Up-dives (U-dives with prey pursuit) -- Depth Duration Effects Over Multiple Dives -- CHAPTER 10. FISH-BIRD STRATEGIES THE SEARCH FOR FICKLE PREY -- Decisions, Decisions, Decisions – How Fish-Birds Search for Prey --

Heading in the Right Direction -- Dealing with Prey Patchiness -- In-depth Considerations: -- Time-based efficiency -- Energy-based efficiency -- Superficial Considerations: Surface Pauses and Inspired Tactics -- Being Picky about Food -- Fish-Birds and Smart Strategies -- CHAPTER 11. THE FINAL SECONDS – HOW FISH-BIRDS CAPTURE PREY -- Prey Acquisition, a Departure from the Dive ‘Norm’ -- Performance Metrics for Prey Capture -- Catching Solitary Prey -- Changing buoyancy with depth affects prey capture strategies -- Prey pursuit against interfaces -- Exploiting Aggregated Prey -- Crustaceans -- Fish -- Non-corralling feeding behavior -- Clarity on Limitations of Penguin Vision -- SECTION V – PENGUINS IN A FICKLE ENVIRONMENT -- CHAPTER 12. TURNING THE TABLES – FISH-BIRDS ON THE MENU -- Basic Law of the Sea: Big Fish Eat Little Fish -- Seals as Predators -- Seals’ hunting behavior -- Penguins avoiding seals -- Fur Seals as Predators -- Sea Lions as Predators -- Killer Whales as Predators -- Sharks as Predators -- CHAPTER 13. PENGUINS ADJUSTING TO A CHANGING OCEAN -- Penguins Have Always Been Challenged by a Changing Ocean -- Prehistoric response to a changing ocean -- Possible prehistoric changes to penguins’ food web -- The Anthropocene: How will Penguins Cope, Now Also Dealing with Humans? -- Response to long-term climate change -- Response to short-term ocean climate variation -- Response to marine pollution -- CHAPTER 14. NOT FORGETTING -- The Social Side - Behavior and Communication at Sea -- Penguin flock fusion/cohesion -- Penguin flock fission/fragmentation -- Navigation -- Long range -- Medium to short-range -- Understanding the Daily ‘Wash’ -- Air flux in diving penguins, an aspect of ‘washing’ -- Are Auks Really ‘Northern Penguins’? -- Research Tags – the Flip Side for Evolutionarily-Honed Fish-Birds -- SECTION VI -- CHAPTER 15. PENGUINS WHY THE HYPE? -- Sources of Hype -- Us -- Many people -- Researchers -- The Transition -- The fascination of species -- Beyond the transition -- Role in Ecosystems -- Biomimicry -- Our Last Word.

Sommario/riassunto

Centuries ago, when penguins were first encountered by European explorers, they were not thought to be birds but rather a fish-like relative. Subsequent accumulation of knowledge has shown penguins to be an avian species with unrivaled aquatic attributes, owing to a number of evolutionary adaptations: shape change, low drag, ability to regulate buoyancy, and extraordinary surface compliancy from their featheration. They are indeed the most extremely specialized diving bird, having given up flight (which otherwise is hugely advantageous) to the benefit of underwater prowess (such as speed, maneuverability and an ability to exploit an extraordinary range of depths). This flightlessness, however, also comes with costs that are substantial for a seabird (such as the inability to cover large distances quickly in reaction to ephemeral prey); and the energy needed to cope with moving through an aqueous environment, which is more resistant than air. For penguins, the high energetic costs in exploiting the ocean environment thus makes them especially sensitive to changes in food availability or their access to their prey. While a number of “penguin books” cover the natural history, mainly of breeding aspects, few address in much detail the incredible aquatic nature of these creatures. A huge amount of information has been amassed over recent past decades thanks to dramatic advances in microelectronics, bio-logging and maturation of some long-term studies of penguin life history. This work represents an integration of all these data with charts, maps and graphs, along with richly illustrated photos by experts in the field. .
