

Intestinal Microbiota and Its Correlates of Diet Composition for Overwintering Relict Gulls: Implications for Comprehensive Conservation of Natural Protected Areas

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Abstract: **【Objective】** The gut microbiota structure of migratory birds is influenced by their food choices, and exploring the potential relationship between diet composition and gut microbiota can help better protect related species and their habitats. This study presents the first evidence on diet composition during overwintering periods as well as the first evidence on the potential relationship between diet composition and gut microbiota in wild relict gulls (*Larus relictus*), one vulnerable species classified by the IUCN Red List. **【Method】** Fecal samples were collected during two consecutive overwintering periods (A group and B group) in the Tianjin coastal wetland by means of non-invasive sampling techniques. High-throughput sequencing technology and microscopic examination technology were applied to analyze the characteristic of diet composition and gut microbiota. **【Result】** The main findings in *L. relictus* were listed as below: 1) the common dominant phyla of both A group and B group included Firmicutes, Proteobacteria, Chloroflexi and Actinobacteriota, while their common dominant genera were *Catellibacillus* and *Ilumatobacter*; 2) the diversity of gut microbiome in B group was higher than that in A group, while the richness was not significantly different; 3) based on the high-throughput sequencing technology of 18S rDNA, the dominant classes within the diet components of *L. relictus* included Polychaeta, Bivalvia, Malacostraca, Gastropoda, unclassified_p_Dinoflagellata, Dinophyceae, and Ostracoda; among them, Bivalvia, Malacostraca, and Gastropoda were also found with microscopic examination technology from the same samples; 4) some positive or negative significant correlations were found between main food and gut microbiota in this study. **【Conclusion】** Wild relict gulls displayed inter-year consistencies and discrepancies of gut microbiota structure in response to the variation of diet choice at the same habitat to some extent during two overwintering periods. Findings from the present study could further provide scientific references for population conservation of this endangered migratory species as well as its habitat conservation.

Keywords: migratory birds; food choice; inter-year consistencies; habitat conservation