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Marine Biodiversity and Ecosystems

Population Ecology and Conservation of Green Turtle (*Chelonia mydas*) in Taiwan

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Host: Dr. Benny K. K. Chan 陳國勤特聘研究員

[Doctoral Dissertation Defense Presentation]

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Abstract

The green turtle (*Chelonia mydas*) is globally endangered and primarily distributed in subtropical and tropical seas. In Taiwan, most research has focused on the nesting population and stranding individuals, leaving the ecology of foraging populations poorly understood. In this Ph.D. thesis, we investigate the population ecology of green turtles in Taiwan using an approach that integrates national-scale observations with localized field studies. First, a citizen science initiative, TurtleSpot Taiwan, was co-developed with citizen scientists to collect sea turtle sightings on a public-access platform. The spatial distribution, main foraging grounds, and demographic characteristics of green turtles across Taiwan were identified based on the crowdsourced data over five years. Liuqiu Island accounted for 77% of total sightings, highlighting it as a major foraging hotspot. Sighting histories revealed that 43.4% of individuals remained in the same area for over a year, with adults exhibiting higher residency than immature turtles. Second, site fidelity patterns at Liuqiu Island, a key foraging hotspot, were assessed using multi-event snorkel-based surveys conducted across tidal phases over two years. Detection probability was influenced by tidal state and survey effort, underscoring the need to evaluate sampling effectiveness and ensure data representativeness. First application of using the Standardized Site Fidelity Index (SSFI) in green turtles, revealed two fidelity groups through hierarchical clustering. By proposing a structured framework for sampling design and fidelity analysis, this study offers a replicable approach to enhance the comparability and reliability of snorkel-based studies on foraging turtle populations. Finally, long-term sightings from citizen science and survey data revealed rare but valuable records of injury recovery in the wild, offering new insights into the resilience and vulnerability of foraging turtles. By integrating citizen-contributed data and standardized field surveys, this work provides an evidence-based strategy for monitoring foraging green turtle populations and contributes practical solutions for conservation in Taiwan and the wider Northwest Pacific region.

Keywords: citizen science, photo-identification, habitat fidelity, SSFI, threats, natural recovery.