

烏溪辮狀河段的魚類棲地時空變異與利用

Fish Habitat Utilization and Spatiotemporal Variability in the Braided River Section of the Wu River

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摘 要

辮狀河川的棲息地易受洪水事件影響而改變或消失，每個水域提供的棲息地條件不同，影響了生物群落的組成，需要完善的監測與評估以保護受威脅的生物。本研究於臺中市烏溪辮狀分歧河段挑選六個水域進行調查，透過階層式集群分析、逐步區別分析與主成份分析等方法，探討棲地時空變異與巴氏銀魮的利用情況。研究發現此六處水域的棲地類型主要可區分為寬廣潭型、淺潭型、冷水潭型和淺流型環境，並確認了因洪水脈衝、季節更替、水域長期發展而產生的改變模式。結果表明巴氏銀魮最常利用上湧的淺潭，其擁有緩慢流速(0.03 m/s)、適度的植被覆蓋與細顆粒的底質。未受洪水沖擊時，該類環境的地表水質與導電度、TDS 呈現正相關，pH 值和溶氧相較下滲的潭穩定。而下滲的水域地表水質易受季節變化及其他環境因素影響。評估巴氏銀魮潛在的棲地時，除考量地表水質與流速外，伏流水上湧下滲、植被覆蓋比例、洪水干擾的頻率、洪水時棲地增加的流量、水域在洪水沖擊後的恢復速度皆為重要的因素。本研究建議針對巴氏銀魮賴以生存的關鍵水域進行長期觀察，評估動物與人為活動是否對棲地環境構成威脅，以利保育工作的長期推進。

關鍵詞：巴氏銀魮、棲地特徵、棲地演化、伏流水區、辮狀河川

Abstract

Habitats in braided rivers are susceptible to changes or disappearance due to flood events, with each waterbody offering different habitat conditions that influence the composition of biological communities. Comprehensive monitoring and evaluation are necessary to protect threatened species. This study selected six waterbodies in the braided section of the Wu River in Taichung City for investigation. Through hierarchical cluster analysis, stepwise discriminant analysis, and principal component analysis, we explored the spatiotemporal variability of habitats and the habitat utilization of *Squalidus banarensis*. The study found that the habitats in these six waterbodies could be categorized into four types: broad pool type, shallow pool type,

cold water pool type, and shallow flow type. The study also identified change patterns caused by flood pulses, seasonal changes, and long-term development of the waterbodies. Results indicated that *Squalidus banarescui* most frequently utilized upwelling shallow pools, characterized by slow flow (0.03 m/s), moderate vegetation cover, and fine-grained substrates. In the absence of flood impacts, the surface water quality in these habitats showed a positive correlation with electrical conductivity and total dissolved solids (TDS), and their pH and dissolved oxygen levels were more stable compared to infiltrating pools. Surface water quality in infiltrating waterbodies, on the other hand, was more susceptible to seasonal variations and other environmental factors. When assessing potential habitats for *Squalidus banarescui*, factors such as surface water quality, flow rate, hyporheic upwelling and infiltration, vegetation cover, flood disturbance frequency, increase in habitat flow during floods, and the recovery speed of the waterbody post-flood are all crucial considerations. This study recommends long-term monitoring of key waterbodies critical to the survival of *Squalidus banarescui*, to evaluate whether animal and human activities pose threats to habitat environments, in order to facilitate the long-term progress of conservation efforts.

Keywords : *Squalidus banarescui*, Habitat Characteristics, Habitat Changes, Hyporheic Zone, Braided River