

## Using Species Distribution Models to Assess the Rarity and Conservation Status of Taiwanese Birds

### 運用物種分布預測模式評估臺灣繁殖鳥類的稀有度及保育現狀

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## Abstract

Taiwan's unique biodiversity is threatened by regional and global change. Therefore, there is an urgent need for improved monitoring and assessment of its flora and fauna. Here, we used a recently established database (1) to build distribution models of most of Taiwan's breeding birds, (2) to use these models to establish a measure of each species' coverage of the study area (called quartile rarity) and (3) to compare this new measure to two already established measures of species' status: namely, recorded rarity as scored by the Chinese Wild Bird Federation (2010) and Taiwanese conservation status as determined by the Council of Agriculture of Executive Yuan (2009). We found that there is a correlation between each species' coverage of the study area, recorded rarity and Taiwanese conservation status.

However, much variation remains unexplained. We focused on those species where there are discrepancies in status assessments between these three measures to be able to better assess the status of each bird species as well as to better monitor these species in the future. We also investigated the relationship of endemic status to the three species status measures: endemic status was not significantly related to the two measures of rarity, but had a significant association with conservation status. We recommend further studies exploring the wealth of biodiversity data now available on Taiwan's avifauna.

## 摘要

由於臺灣的生物多樣性受到地區性與全球變遷的威脅，改善評估臺灣動植物現況的方式為當務之急。本文以近期建立的臺灣繁殖鳥類分布資料庫(1)建構臺灣繁殖鳥類的分布預測模式，(2)由模式預測結果建立新的評估標準「四分位數稀有度」，(3)比較「四分位數稀有度」與現存評估標準(包括由中華民國野鳥學會提供之「紀錄稀有度」與行政院農業委員會野生動物保育名錄之「保育等級」)。我們發現各鳥種在臺灣分布面積與紀錄稀有度、保育等級相關，然而三者間仍存在部分變異，因此進一步檢視在此三項標準間存在變異的鳥種。本研究並非意圖批評現存的標準，而是希望藉由檢視三項標準間的異同以評估物種狀態，並在未來提供更好的監測方式。此外，本文亦評估了特有狀態與前述三項標準的關係，但特有性與三者皆無顯著相關。我們建議未來可有更多研究善加利用已經建置且數量豐富的臺灣鳥類生物多樣性資料。

**Key words:** biodiversity, conservation priorities, GIS, sampling effort, endemism

**關鍵詞：**生物多樣性、保育優先性、地理資訊系統、調查努力量、特有性

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## Introduction

The conservation of biodiversity has gained increasing attention from both the public and decision-makers because biodiversity is the basis for functioning ecosystems and the life-support system of the earth.

Ecosystem services have increasingly been

recognized as important to society both for the inherent value of the continuing existence of species and for their functional and economic value, such as to filter out pollution or to foster ecotourism (Millennium Ecosystem Assessment 2005). However, all levels of biodiversity have been rapidly eroding, despite repeated international and national pledges and efforts to halt the global,