2007 年八色鳥國際研討會
2007 International Symposium For Fairy Pitta

～FOR BIRDS, FOR PEOPLE, FOREVER～

PROGRAM
大會議程及論文手冊

Yulin, Taiwan, Republic of China
台灣 雲林縣

10 AUG, 2007
中華民國九十六年八月十日

2007 年八色鳥國際研討會

2007 International Symposium For Fairy Pitta

～FOR BIRDS, FOR PEOPLE, FOREVER～

指導單位：立法委員尹伶瑛國會辦公室、行政院農委會林務局、交通部觀光局、行政院環保署

主辦單位：社團法人中華民國野鳥學會

協辦單位：中國石油股份有限公司、雲林縣政府、雲林縣政府文化局、雲林縣政府教育局、雲林縣野鳥學會、全國各地野鳥學會

贊助單位：台灣電力股份有限公司

TABLE OF CONTENTS 目錄

SCIENTIFIC PROGRAM 議程

大會流程 Schedule			
8/10 星期五 研討會 10 Aug, Friday, Symposium			
08:30-09:00	報到 Registration		
09:00-09:40	Keynote speech: 台灣大學 李培芬教授 Prof. Pei-Fen Lee Taiwan University	八色鳥的研究與區域合作之展望 The research of Fairy Pitta and future prospect of regional cooperation	中文 in Chinese
09:40-09:45	討論 Q & A		
09:45-10:15	開幕 Opening ceremony 貴賓： 中華鳥會 郭東輝理事長、立法院 尹玲瑛委員、農委會 李健全副主委、農委會林務局 李桃生副局長 Distinguished guests Mr. Kuo, President, WBFT Ms. Ying, Legislator Mr. Lee, Deputy Minister, Council of Agriculture Mr. Lee, Deputy Director, Forestry Bureau, Council of Agriculture		
10:15-10:25	寶貝八色鳥-獻上一個心願 A wish for Fairy Pitta 請與會貴賓寫下心願貼在八色鳥身上		
10:25-10:45	休息 break		
10:45-11:25	Ms. Eun-Mi Kim 韓國濟州島鳥類協會 理事長 President, Jeju Birdwatcher Group, Korea	韓國濟州島八色鳥的分佈及棲地研究 The distribution and habitat of Fairy Pitta on Jeju Island, Korea	英文 in English
11:25-11:30	討論 Q & A		
11:30-12:10	Mr. Petch Manopawitr 泰國鳥會副理事長 Vice Chairman, BCST, Thailand	泰國八色鳥的保育：經驗與教訓 Conserving Gurney's Pitta in Thailand: experience and lesson	英文 in English

		learned.	
12:10-12:15	討論 Q & A		
12:15-13:30	午餐 Lunch（lunch box） 雲林八色鳥保育史海報展及解說導覽 Poster exhibition of the history and achievement for conservation of Fairy Pitta in Yunlin		
13:30-14:10	Ms Somying Tanhikorn 泰國國家公園署 富良野生動物研究中心 主任 Director, Phuluang Wildlife Research Center, Department of National Park, Thailand	泰國八色鳥的研究 Research on Gurney's Pitta Ecology	英文 in English
14:10-14:15	討論 Q & A		
14:15-14:55	Dr.Nick Brickle 野生動物保育學會印尼計畫 計畫經理 Program Manager WCS-Indonesia Program	印尼八色鳥的保育 Pitta Conservation in Indonesia	英文 in English
14:55-15:00	討論 Q & A		
15:00-15:30	休息 break		
15:30-15:50	林瑞興 Mr. Rey-Shin Lin Researcher, TESRI	湖本村 2004 至 2007 年經繫放八色鳥的再目擊 Reobservation of Banded breeding Fairy Pittas (*Pitta nympha*) in Huben Village, Taiwan, between 2004 and 2007	中文 in Chinese
15:50-15:55	討論 Q & A		
15:55-16:15	陳宛均 Miss Wan Jyun Chen Taiwan University	八色鳥的繁殖與天敵 - 以湖本村為例 The Impact of Nest Predators on the Nesting Success of the Vulnerable Fairy Pitta	中文 in Chinese

		Pitta nympha in Huben Village, Taiwan	
16:15-16:20	討論 Q & A		
16:20-16:50	綜合討論 Panel Discussion		
16:50-17:10	閉幕 End of symposium		
17:10-18:00	圓桌討論-邀請外賓共同討論未來區域合作之發展 Round table on future regional cooperation		中英文 in Chinese and English

KEYNOTE SPEECH 專題演講與專題報告

韓國濟州島八色鳥的分佈及棲地研究

The distribution and habitat of Fairy Pitta on Jeju Island, Korea

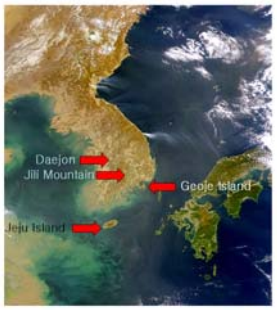
濟州島上的八色鳥

韓國的八色鳥

- 在韓國是稀有的夏候鳥.
- 每年五月底抵達,十月初離開
- -主要繁殖期: 夏天的雨季
- -主要繁殖地:
  - GeoJe island in Gyeongsangnamdo province
  - 濟州島
- -最近繁殖紀錄:
  - Daejeon-si
  - Jili Mountain

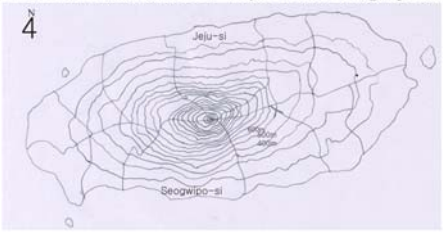
這是韓國地圖.

濟州島位於韓國最南端



在島中央有一座Halla山

濟州島因此而分為南北兩區, Jeju-si and Seogwipo-si.



-韓國大部份的八色鳥族群都在濟州島

-但是八色鳥的研究甚為不足

-我們不知有多少對繁殖和他們在濟州島何處繁殖

-本人研究2002至2006五年繁殖季(五月至八月)中在濟州島八色鳥的配對數和一處繁殖地.

-濟州島八色鳥的歷史調查簡述

-濟州島的第一筆記錄: 1918年一位學者報告他在Halla山南麓採集到八色鳥

- 1964 : 報告指出八色鳥棲息於海拔1,200m 至 1,600m 的高度

-1968 :報告指出八色鳥於海拔1,000m 至 1,200m 的高度繁殖

-1984 : 於Halla山北麓海拔500m 至600m 的高度觀察到八隻八色鳥

表1. Halla山上八色鳥的高度和區域分布

Altitude(m zone*)	Survey area	Individual numbers
100	Seogwipo-si	1
	Jeju-si	2
	Subtotal	3
200	Seogwipo-si	5
	Subtotal	5
300	Seogwipo-si	7
	Jeju-si	3
	Subtotal	10
400	Seogwipo-si	13
	Jeju-si	3
	Subtotal	16
500	Seogwipo-si	9
	Jeju-si	11
	Subtotal	20
600	Seogwipo-si	1
	Jeju-si	2
	Subtotal	3
700	Jeju-si	2
	Subtotal	2
800	Seogwipo-si	1
	Subtotal	1
Grand total		60

* 100m zone : 100m~199m

八色鳥棲地特質之一:潮濕

- 可見青苔覆蓋岩石

八色鳥棲地特質之二: 陰暗

八色鳥棲地特質之三：濃密森林邊緣的寬闊山谷

八色鳥棲地特質之四：：山谷中水源充足

八色鳥棲地特質之五：難於接近

八色鳥棲地特質之七:長期堆積的落葉
(您知道生活其下的生物有哪些?)

-八色鳥在樹上及大石塊築巢

-最近我知道八色鳥在地上築巢

-但迄今握尚未建地上築的巢

表2. 巢的位置及高度

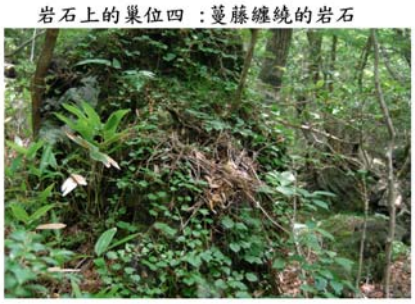
	Rock	Tree	Total
Under 1m	2		2
Between 1m and 2m	13	1	14
Between 2m and 3m	3	3	6
Total	18	4	22

岩石上的巢位一 ：位於岩石的陡峭面

岩石上的巢位二 ：位於岩石的中央

岩石上的巢位三 ：在岩石頂部

岩石上的巢位四 ：蔓藤纏繞的岩石



岩石上的巢位五:岩石間縫隙

岩石上的巢位六 ： 低於1m

岩石上的巢位七 ： 介於 1m至2m間

樹上的巢位一:五分岔的樹幹

樹上的巢位二:
二分岔的樹幹

八色鳥繁殖的過程
此為一典型八色鳥的鳥巢
巢的厚度通常是60cm, 相對於其體型相當大

這是八色鳥的卵
八色鳥一巢4-6個卵

抱卵期約12天

孵化的雛鳥

餵食:蚯蚓是主食

餵食後,親鳥等著以喙銜出其排遺

離巢前的幼鳥

幼鳥跟隨親鳥落至地面活動

繁殖失敗的原因:

-受掠食者侵擾,如:蛇類及樹鵲

-因人類頻繁的來往干擾

-因自然災害所致

樹鵲:掠食八色鳥的卵及雛鳥並破壞鳥巢

蛇類:掠食鳥卵及雛鳥

人類頻繁的來往干擾及垃圾堆積

自然災害:當豪雨成災,山谷水道傾洩,
八色鳥巢就泡水了

威脅八色鳥最大的是林相的改變:竹林的蔓延

其次:由於建設開發破壞森林,忽視了八色鳥

感謝您

講者簡介

Eun Mi Kim
President
Jeju birdwatchers Group

organizing our Group ' Jeju birdwatchers Group' in 2003.

- I graduated the master's course of Cheju University in 2004.

- I attended the meeting '2004 International Workshop for Conseervation of Jeju Black-faced Spoonbill Wintering'
- I published a guidebook for birdwatcher ' A Mini Field Guidebook of Korea Birds'

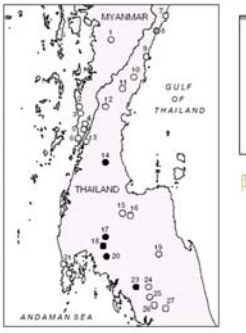
- I am a writer writing book in relation to birdwatcher and children and taking picture.

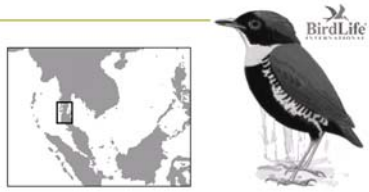
泰國八色鳥的保育：經驗與教訓 Conserving Gurney's Pitta in Thailand: experience and lesson learned.

泰國八色鳥的保育經驗與教訓

Petch Manopawitr
Vice-chairman, BCST
泰國鳥會副理事長
WCS Thailand Program

背景: 分佈



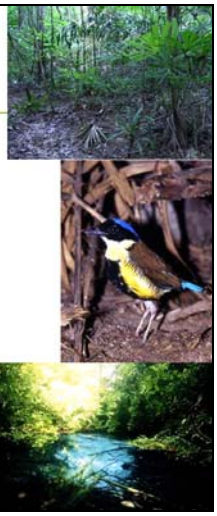


限於泰國半島,在南緬甸北緯7到12度

過去25年分佈記錄

背景: 生態

- 局限在泰國半島與南緬甸的半長青雨林溼地
- 有記錄的棲地都在80-140公尺,但大部分都在100公尺以下



背景: 生態

- 潮濕的山谷和低密度的低層植物構成這區域的主要因素
- 八色鳥的分佈主要是在低層植物,有濕度的小碎葉和有蚯蚓的地方

背景: 獨特的歷史

1875	▫ 最先發現在南緬甸和泰國 (Hume and Davidson 1878)
1910s - 1920s	▫ 1914年最後在緬甸被發現 (Abdulali 1968-1986) ▫ 在泰國曾有被發現的紀載
1936	▫ 最後是在泰國被發現 (Meyer de Schauensee 1946)
1950s - 1980s	▫ 1952年在泰國南部發現未列入記錄的母鳥品種 ▫ 1975年在英國和1980年在泰國都有被補獲的記錄
1985	▫ 華盛頓公約已列爲絕種鳥 ▫ 英國廣播公司報導爲高可能性絕種鳥
1986	▫ 在泰國重新發現40對八色鳥

Background: Conservation Efforts

1987	▫ 1993年泰國皇家和林務局宣佈不准獵殺地區和野生聖地
1990-94	▫ RFD和國際鳥盟與Mahidol大學聯合建立低地森林計劃
1995-99	▫ DANCED和丹麥國際鳥盟和Mahidol共同執行KNCP的第二階段
2000	▫ 在KNC非正式的堪察,找到12對泰國八色鳥
2002	▫ DNP (以前的RFD), BCST and RSPB共同建立五年保護泰國八色鳥的備忘錄
2003 to present	▫ 泰國八色鳥保育計劃成立和執行

2003年重新在緬甸發現泰國八色鳥

- 一組鳥盟人員和當地鳥組織政府機關在南緬甸四個地方重新發現最大的八色鳥族群:12對
- 仍存在約大於1,000平方公哩的大片的低地雨林
- 不過大部份的雨林棲息處已迅速被改爲棕櫚油樹的種植園

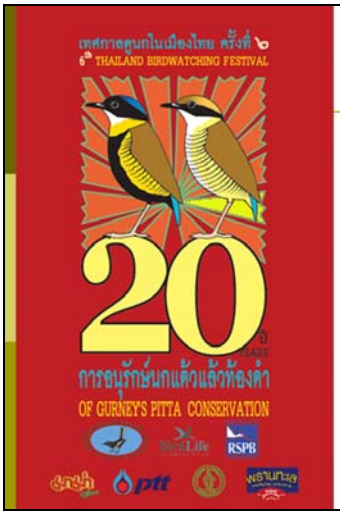
BirdLife INTERNATIONAL

2003年重新在緬甸發現泰國八色鳥

國際鳥盟認定的二項優先目標:

- 1) 急速在緬甸找出最大片的低地森林以便發展保育計劃
- 2) 與當地的泰國南部官員做密切的合作以便保護數目不多但仍非常重要的八色鳥種

BirdLife INTERNATIONAL



20 年的保育，爲什麼仍不

今日:

- 重點棲息處只存留小於20平方公哩
- 鳥群數量估計只有大約20對

- 在泰國八色鳥仍然是最瀕臨絕種的鳥種
- 華盛頓公約條例一 I
- 受泰國最嚴厲地法律保護

直接的威脅

- 棲息處的流失
- 棲息處的低品質化
- 販賣

間接的威脅

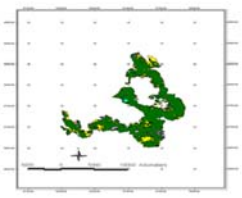
- 數量減少
- 遊客的打擾和NTFP的收藏

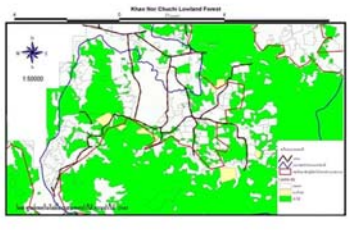
森林濫伐之前的重新發現

- 低海拔森林往往最先被盜伐
- 至1980年,所有低海拔森林幾乎全被濫伐
- 只剩下30平方公哩的保育地，但也將變成十分地支離破碎

森林濫伐之後的重新發現

- 新遷移的人類加速減少棲息處的面積
- 建立保護區並不包括主要的棲息處
- 各部門沒有統籌沒有定調的能力使得法律難以執行





Khao Nor Chu-Chi 森林保護計劃
KNCP 第一及二階段 1990-9

社會經濟 **ICDP** – 整合保育發展的**150**萬元投資計劃

目標

- 加強林務局在保護區的法律執行
- 在計劃區內採取持續又不損害環境的農作物種植
- 社區參與棲息處管理及保育
- 加強提倡保育事項

森林保育第一及二階段 199

主要記取的教訓:

- 地权及地界劃分不清，導致森林濫伐
- 取消森林管理員，及有些地帶重疊管理，大量減低保育發展及合作
- 要政府部門直接參與及找對的人去加強管理的透明化

森林保育第一及二階段 199

主要記取的教訓 (續):

- IDCP太理想化I:當地居民並不代表一個整體一移民難參與
- IDCP太理想化II：橡膠樹與棕櫚油樹的回收太吸引農民，法律也沒有嚴格執行管制
- 保育動作及八色鳥種的注意，更引起捕捉行爲及交易

森林保護:完結篇　　故事完沒?

- 計畫終結:政府官員缺乏決心加強高度的衝突
- 森林仍受到高度的侵佔
- 如果森林砍伐仍然繼續,泰國八色鳥在五年內會消失
- 短期工作小組仍在努力，但沒有長期保育計畫

MOU between DNP-BCST-RSPB for the Conservation of GP in Thailand signed in 2002

2002年12月泰國八色鳥保護計劃

主要目標

要保持及增加泰國八色鳥的數量，也提昇當地居民的生活及自然資源的多元化

受益者:

政府: DNP, RFD, BPP, Regional Army, Provincial Office, Local Administrative Office

社團: BCST, RSPB, WCS, OBC, WWF, WFT, HF

居民

大學: Mahidol, Kasetsart

成果I: 政府設定計劃及工作計畫去管理保護水源

- 由國際機構做管理及顧問
- 設立技術小組看管研究及計畫
- 加強DNP機構內外的合作
- 泰國八色鳥為鳥種指標

成果 II: 停止森林及野生環境的破壞，加強法律制裁

- 低地森林保護小組成立
- 在主要點設立檢查站及土地劃分完成
- 加強森林管理員的執法訓練

成果 III: 使原地居民領袖，青少年和關心人士知道低地森林的保護

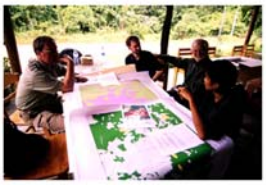
- 兒童參與生態保育營
- 長期與居民溝通
- 向大眾做公開報導

成果IV: 讓居民減少開支，從各項職業增加收入

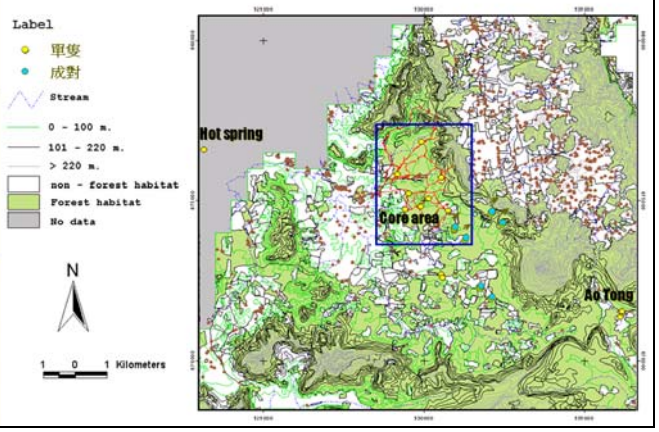
- KNC 自然環境生態小組成立
- 支持永續性的農作物耕種小組
- 提供其它自然生態有關的工作機會，如旅遊及工藝品

成果V: 清楚的記錄及報導有關泰國八色鳥的狀況

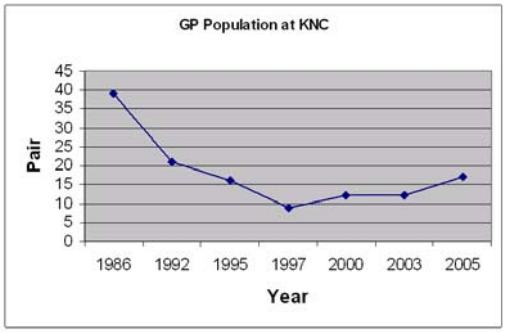
- 研究中心小組由Dr. Paul Donald領導
- 重點研究問題包括:棲息處，環境縮小的影響及繁殖的成功率
- 研究計畫目的在a)數量分佈的調查b)築巢的資料c)棲息處的衡量



目前泰國八色鳥的分佈與未來 ??



數量走勢


GP Population at KNC
Pair
45
40
35
30
25
20
15
10
5
0
1986
1992
1995
1997
2000
2003
2005
Year

謝謝大家!

Background Information for Gurney's Pitta
Pitta gurneyi Recovery Project

Factfile

Family: Pittidae

Distribution: Peninsular Thailand and adjacent S. Myanmar from ca. 7 deg to 12 deg N latitude.

Habitat: Lowland semi-evergreen rain forest of the Thai-Burmese floristic formation

Size: 18.5-20.5cm

Plumage: Male has irridescent blue crown, black sides to head and white throat. Back, wings and tail are golden brown (lacking white in the wing) with a turquoise-blue upperside to the tail. Underparts brilliant yellow, with black belly patch and flank bars. Female: Back, wings and tail as male. Otherwise, colouration much more subdued, with yellow-ochre crown and sides to head, dark brown face mask and brown transverse bars on whitish-buffy underparts

Voice: Loud explosive advertising call “lillip”, explosive whining “skyew” contact note

Nests: Domed nest usually built in spiny understorey palms

Eggs: 3-4; white finely spotted with brown; 25.3-27 x 20-22.4mm, incubation 13-14 days; nestling period 13-14 days.

Diet: Forest floor invertebrates, especially earthworms, insects, occasionally frogs and lizards largely taken in the breeding season for nestlings

English names: Gurney's pitta; Black-breasted pitta

Thai name: “nok taew-laew thong dam”

Introduction

Gurney's pitta is a resident of lowland forest, with a range restricted to a small area of peninsular Thailand and southern Myanmar . Within Thailand , most of its preferred forest habitat has been cleared and replaced by oil palm and rubber plantations, grassland and human habitation. The remnant population is consequently one of the smallest in the world of any bird species and most recently estimated to be 12-17 pairs in 2001. There is no recent reliable information on its status in Myanmar , where it has not been reliably recorded since 1914. The only evidence that it survives in Myanmar is the occasional appearance of birds in bird markets and zoos in Thailand . Gurney's pitta is currently classified as Critically Endangered under IUCN/BirdLife International threat criteria with a very small, declining population. A full account of its ecology and history of conservation may be found in BirdLife International (2001).

Taxonomy

Class: Aves

Order: Passeriformes

Suborder: Tyranni (the Sub-oscines)

Family: Pittidae

Genus: Pitta

Species: *P. gurneyi*

Distribution and population status

The global distribution of Gurney's pitta is restricted to southern Thailand and adjacent Myanmar (Thanintharyi) between approximately 7 deg and 12 deg N latitude. It inhabits forest and well-watered secondary growth of the extreme lowlands, below the hill foot boundary, placed by Wells (1976, 1999) at ca. 150m elevation throughout the Thai-Malay peninsula. All reliable records of

Gurney's pitta have been below 150m, apart from one pair reportedly at 200m on a plateau.

Table 1. Population and distribution of Gurney's pitta

Country	Province	Site name	Sector	Population	Protection status
Thailand	Krabi	Khao Nor Chuchi	Khlong Thom	Estimated 35-40 pairs in 1987; declined to ca. 21 pairs in 1992 and ca. 12-15 pairs by 2000	5 of 21 territories inside the wildlife sanctuary in 1992
Thailand	Trang	Khao Nor Chuchi	Aow Tong	5-6 pairs minimum in 1987; 2 pairs in 2001	All outside the wildlife sanctuary
Thailand	Krabi	Khao Phanom Bencha Nat. Park and Khlong Phraya Wildlife Sanctuary		5-6 pairs in 1988; One calling male found in 1992; no recent information but most habitat thought to have been cleared	All pairs unprotected
Thailand	Surat Thani	Tha Chana		One bird heard in Jan 1987; no recent information	Unprotected
Thailand	Surat Thani	Khlong Yan		Two territories found in 1988; no recent information	Unprotected
Myanmar	Tanintharyi Division			No recent information	Effectively unprotected

Most remaining pairs are located in and around Khao Pra-Bang Khram Wildlife Sanctuary, also known as Khao Nor Chuchi. The fate of birds recorded elsewhere in the late 1980s, such as at Khao Phanom Bencha and Khlong Phraya, is presently unknown. Because Gurney's pitta occurs in secondary growth forest, there is a possibility that other birds may still be present at other sites in the Thai portion of the peninsula. However, it is highly unlikely

that there is a large enough area of habitat to support a potentially viable population anywhere other than at Khao Nor Chuchi. The situation in Myanmar remains unknown. There could potentially be sizable areas of lowland secondary growth remaining there, though it will be subject to similar threats to those in Thailand .

Movements

Gurney's pitta is apparently resident throughout its range. Pairs are thought to remain on territory year-round. The dispersal patterns of first-year birds are not known

Protection status

Gurney's pitta is classified as Critically Endangered under IUCN/BirdLife threat criteria. It is protected by Thai legislation (Wild Animals Reservations and Protection Act. 1992) receiving the highest level of protection as a Nationally Reserved Species.

Relationship with other Recovery & Action Plans and biodiversity strategies

Gurney's pitta is listed in Appendix 1 of CITES to which the Government is a signatory. Thailand is a signatory of, but has not ratified the Convention on Biodiversity (CBD). OEPP produced a NBSAP in 1997 entitled ‘Policies, measures and plan conservation and sustainable use of biodiversity 1998-2002'.

Habitat requirements of the species

Gurney's pitta inhabits lowland forest, apparently including both mature forest and older secondary growth. Many of the areas which support Gurney's pittas today were buffalo pasture 40-50 years ago, which has since regenerated as forest, and the suspicion is that secondary growth is its preferred habitat. However, it appears to require year-round access to water and/or associated

habitats in small forest streams and gullies, and moist, though not swampy forest floor conditions. One pair nested successfully in a ca. 2ha remnant patch of forest, surrounded on three sides by paddies, and connected by a narrow neck to neighbouring forest. Areas favoured by Gurney's pittas typically have a high frequency of palms in the understorey. Bamboos are also often present. Nests have been recorded in spiny palms: *Salacca* , *Licuala* and *Calamus* , usually 1-3 m above the ground. Habitat use within territories remains poorly known.

Biology and ecology

Gurney's pitta breeds in the wet-season (May to August, with a single nest in October) laying 3-5 (usually 4) eggs. Both parents incubate for an estimated two weeks. Nestlings are typical for passerine birds in being altricial. However, they develop rapidly and leave the nest after only 13-14 days, when still only one-third the size of adults. They then spend several weeks in the care of the adults, learning to forage. There is no information on post-fledging survival or ecology because of extreme difficulty in detecting birds post-nesting.

Recent studies indicate low nesting success levels. Of 14 nests, young fledged from only 4-5 (mortality rate was at least 72% when all known eggs and chicks are considered). Known causes of nest losses (eggs and nestlings) are predation by snakes and possibly squirrels as well as human interference. Reduced breeding success is a problem commonly associated with habitat fragmentation, and might account for the reduction in territory densities within remaining habitats.

Gurney's pitta is usually encountered in primary and secondary forest, usually singly or in pairs. The birds forage on the forest floor, moving by bounding hops, and feeding mainly on forest floor invertebrates such as insects, earthworms and spiders. They will also take frogs and possibly other small vertebrates.

The same areas usually support nest-territories in successive years providing the habitat remains intact. However, solitary males are seen patrolling through marginal habitats (including edges of rubber plantations), calling, before the onset of breeding. They appear to be able to cross gaps quite well. A male was observed to fly ca. 50m across a freshly burnt clearing.

Threats and potential threats

- Forest clearance

The principal threat to Gurney's pitta has been and remains the clearance of lowland forest, leading to loss of suitable habitat and fragmentation of remaining habitats. Such forests have been cleared for agriculture and this process accelerated after 1945 until the 1980s when most lowland forest had been cleared. Forests were cleared for the establishment of plantations of rubber, oil palm, croplands and more recently coffee. Existing plantations are also routinely enlarged usually through burning then cutting adjacent forest. Remaining forest is bought and sold, even though land transfers lack proper documentation and are illegal. Increased demand on land, fuelled by speculation in land as a commodity, means that there is continued small-scale immigration of people into the area.

- Illegal logging

Though small-scale, illegal logging has been widespread within the range of Gurney's pitta. A practice that is much less common and not considered to be a primary threat.

- Opportunistic capture or destruction

Forest product collectors may occasionally encounter nesting pittas and theft of nestlings has been recorded. Nocturnal fishermen/ frog-hunters working along forest streams may also occasionally encounter roosting pittas. One such was reportedly found as a corpse, having been stabbed by a fishermen's harpoon. Local people may view Gurney's pitta conservation efforts as an impediment to gaining land ownership, and therefore actively seek to destroy birds.

- Wildlife trade/zoos

A Thai zoo was reported to possess 5-8 Gurney's pitta in 1995. All have since died. Others are thought to be in captivity in Thailand . Perversely, well-intentioned conservationists, by drawing attention to the plight of a species, can actually increase its market value, thereby encouraging the illegal trade.

The low capacity of wildlife enforcement, the negligible threat of being apprehended and the low fine if caught mean that the wildlife trade in Thailand continues to be maintained.

Opportunities and risks of the Species Recovery Plan implementation

Opportunities

1. Gurney's pitta is a charismatic, striking and well-known species with high media and tourism potential

2. The species appears to survive in secondary growth, which it might be possible to recreate relatively easily and quickly elsewhere

3. Gurney's pittas may possibly be bred in captivity

4. Gurney's pittas appear to be easily attracted to supplementary food, allowing opportunities for capture for ringing or radio tracking

5. There exists a considerable body of expertise on the successful *in situ* conservation of critically threatened bird species

6. It may be possible to start a captive breeding programme from birds confiscated from bird markets

7. Populations may still exist in Myanmar

8. It may be possible to manipulate agroforestry systems in the region to be suitable for Gurney's pitta

9. Gurney's pitta probably replaces lost clutches and may be multi-brooded

10. Much data on the forest are available following a recent DANCED conservation initiative

Risks

1. There may currently be insufficient capacity within some key stakeholder groups to deliver the Recovery Plan recommendations

2. Some local people regard conservation efforts as contrary to their own interests and might not participate in or assist conservation initiatives

3. There is a high turnover of RFD staff in the region

4. The species' biology and ecology are poorly known

5. Populations outside of the core range are poorly monitored and managed

6. Gurney's pitta chicks appear to remain with the parents for some time, making the reintroduction of captive bred chicks problematic

7. Attempts by visiting birdwatchers to see Gurney's pitta by using playback of calls or providing food could compromise future research and conservation initiatives

Last Flight of the Gurney's Pitta?

Petch Manopawitr
Bird Conservation Society of Thailand (BCST)

It could happen so fast – the process of a species becoming endangered. Before 1940s, the colourful Gurney's Pitta was likely to exist in great number. Hundreds of the bird's specimen are kept at museum around the world, 62 at Britain's Natural History Museum along. After 1946, however, no sighting of the bird was reported. At one point, the bird was actually assumed to have gone extinct.

Until its remarkable rediscovery in 1986 by two ornithologists, Philip D. Round and Uhai Treesucon. News was not all good, however. Followed the joy of rediscovery was concern about how to ensure the survival of this endangered bird. The environment was hostile, to say the least. The 35 pairs of Gurney's Pitta were found in a lowland rainforest at Khao Nor Chu Chui Krabi province, where poaching, deforestation and bird hunting was commonly practiced.

A year after the recovery, the government announced the bird's habitat a non-hunting area and later a wildlife sanctuary. Three years later, the then Royal Forestry Department and the Conservation Biology Center, Mahidol University set up the Khao Nor Chu Chi Lowland Forest conservation project (KNCCP) to help save the bird, which is restricted to lowland forest.

Two year later, the Gurney's Pitta was accorded the status as one's of the country's reserved animals, which deserves maximum protection. Ten years have passed. The attempt apparently failed to protect the bird. The project fold in 1999. The number of Gurney's Pitta was reduced to about 13 pairs. Why did it fail? Many reason were cited including the fact that the conservation area boundary did not comprise the area where most of the birds resided, the inability to enforce the laws and conflicts between government officers, non-governmental organization staff and local villagers.

But why the fuss over the survival of this particular bird? For one thing, the fate of Gurney's Pitta epitomised the problems of wildlife conservation in Thailand. Not only is details about the species is needed to map out a plan to conserve it but it is imperative to ensure cooperation from every party and stakeholder involved in the matter. Also, the lowland rainforest where Gurney's Pitta lives is also home to many

lowland endemic species including Black Hornbill, Red-crowned Barbet and Large Wren-Babbler. To save the habitat means saving these birds and other fauna and flora that is found there as well.

A year after the KNCCP closed down, a few international ornithological societies started campaigning for the conservation of the Gurney's Pitta. During the British Birdwatching Fair in 2000, more than 3,000 people signed their names and made donation for the cause.

Since 2002, Bird Conservation Society of Thailand (BCST), Royal Society for the Protection of Birds (RSPB) and Department of National Park, Wildlife and Plant Conservation (DNP) together with other partners have worked together to make another attempt to save remaining few Gurney's Pittas. This time, they have established a bird conservation network encompassing every stakeholder into the project, be they government officers, forestry staff, local villagers academics and conservationists. A plan was drawn for an initial implementation period of five years. While the aim is to conserve and if possible increase the number of the Gurney's Pitta in the area, the action plan will seek to promote sustainable development for people in the community as well as safeguarding the bird's habitat. In short, it aims at sustaining both the bird and people.

At this stage, the coalition has come up with more than 40 initiatives for implementation. Whether it will succeed, nobody can tell. The only thing we know is the survival of a species is at stake.

講者簡介

PETCH MANOPAWITR

Petch is a Deputy Director of Wildlife Conservation Society (WCS), a New York-based International Conservation Organization, Thailand Program where he oversee site-based conservation activities at Kaeng Krachan National Park including Elephant Population and Tiger Survey, Human-Elephant Conflict, Law Enforcement Monitoring, and some other WCS's conservation operation in Thailand. He has served as Executive Committee for Bird Conservation Society of Thailand (BCST), Thailand's BirdLife partner, since January 2002 where he oversees its conservation operation including Gurney's Pitta conservation project.

泰國八色鳥的研究
Research on Gurney's Pitta Ecology

Research on Gurney's Pitta (*Pitta Gurneyi*) Ecology in Thailand

RSPB

BCST

- **Critically Endangered**
  By BirdLife International/IUCN
- On extinction, with a very small Population
  Khao Nor Chuchi in peninsular Thailand

Female Male

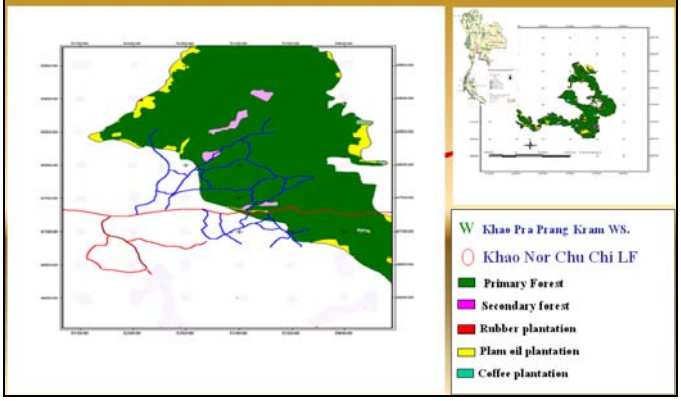
Distribution on 1988 (Gretton et al.1988)

1. Khao Pra Bang Khram ws.
2. Khlong Phraya ws.
3. Tha Chana D,Surat thani
4. Khlong Yan Valley

Present…

At one site in Khao Nor Chu Chi Lowland forest,some area in Khoa Pra Bang Khram ws.

Study area: Khao Nor Chuchi Lowland forest



Research on Gurney's Pitta

- To assess the population and distribution of Gurney's Pitta at Khao Nor Chuchi Lowland forest

- To assess patterns of movement of birds within the core area and so understand more about the species demography

- To assess breeding success and the causes of nest failure

- To assess habitat and other ecological requirements and patterns of habitat use to inform the process of habitat recreation and restoration

To assess breeding success and the causes of nest failure

Methods

1. Nest finding

Walking slowly through their known territory in core area,especially on flat area and in gully. Carefully searching on Salacca,Rattan and Clock palm

2. Nest observation

The 1.3x1.3x 2.0 m^3 was set at night,at least 8 m. from nest

The first researcher observed the nest in the blind from 0600-1200 and shifted by another for the next 1200-1800.

The researchers collected data about parent and nestlings'behavior as well as brood diet,using binocular or telescope



3. Nest guarding

Nest guarding started at 1800-2400 and 2400-0600, using 1 guardian per part.Shifting was done at midnight

Soft light was taken every 5-10 minutes,to search for natural predators.

If a predator was detected,the guardian could leave from the blind toward the nest to chasing or catching the predator out from nesting area



Result

The nest surveying from April 03-September 06 found 24 potential nests (built on rattan13,salacca7, clock palm 1,standing tree 1 and vine crossing 2)

The nest were found in May to October

Eight active nest were found,which were observed the nesting activities for 4 nests



Nest

Nests were built on rattan(n=13)(54%), salacca(n=7)(29%),clock palm(n=1)(4%)

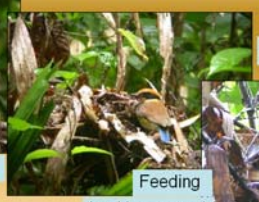
Position were on fork, in the middle, on a horizontal branch

Nests were built at 0.7-6.2m. height, 0-more than 60 m. from water, 1-100 m. from trail.

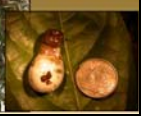
The nests were round shape, opening existed on nest side, which turned up a little

The nest structure :


Behavior





Incubation period is 11-17 days.

Brood rearing

Parental care

Feeding

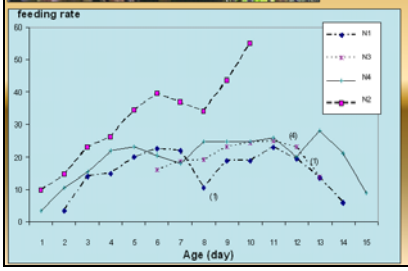
Looking around

Rearrange the nest

Picking off fecal sac

Feeding rate (times/day)

Graph feeding rate showed that the parent increase the feeding rate until the chicks are 5 days old,6-11 days old fed at that feeding rate to stable (Avg 20-25),after 11 days old, the parents decrease their feeding rate until the chicks leave the nest.



Main diet is earthworm(70.6%-88.4%), other diet are ground beetle, larva and beetle maggot

Development of chicks

Relationship with other wildlife

100% of the nests failed in nest-building period (n=6) were disturbed by human activities.

The parent respond to Hooded Pitta,domestic dogs, Bay Owl, red legged Crake by making a series of "Skyew" call.

Natural predators found at observed nest are Cat-snakes(Boiga spp.),5 Mangrove snake, 4 Dog-toothed,1Jasper snake

Natural Predator

parent experience

Nesting success

15 failed nest were failed in period of nest building 6(40%), incubating 5(33%),and brood rearing 4 (27%)

The data from 4 observed nests as show in table indicated that the hatched rate is very high(93.8%), chick survival rate with nest guarding is 50%, chick survival rate without nest guarding is very low at 8.3%, and average survived fledgling per nest is 0.25 individuals

No.	Eggs	Hatchlings	Fledglings*	Predators
1	4	3 (75%)	1 (33%)[a]	5
2	3	3 (100%)	0 (0%)	2
3	4	4 (100%)	4 (100%)	2
4	2	2 (100%)	1 (50%)[b]	2

Note: * = after guarding from predator
a = 1 chick was predator,1 chick starved.
b = 1 chick was predate

To assess habitat and other ecological requirements and patterns of habitat use to inform the process of habitat recreation and restoration

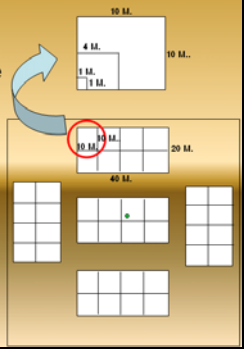
Methods

1. Microhabitat at nesting site

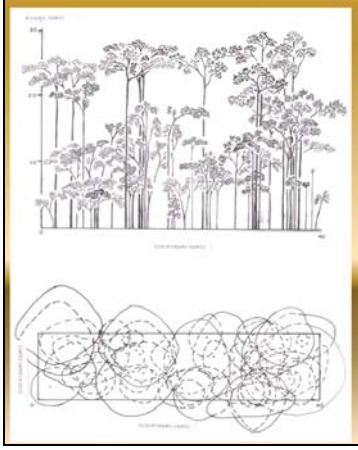
Five of 20x40 m^2,plots were set at the nesting site,to measure tree st.

A plot of 4x4 m^2,was set to collect sapling data.the 1x1 m^2 plot was set to collect seedling data

Distubed sampling of soil were collected from the nesting site and other 4 surrounding area at 10 m.from nesting site.The ground covers were caculated from fisheye lens photograph



Result



There were 3 canopy layer

The dominant tree species were *Saraca indica* (IVI=37.85) *Alstonia macrophylla*(IVI=34.50)

The dominant seedling species are Rubiaceae=29.33%, Garcinia merguensis=15.33%, Annonaceae=14.89%

The dominant sapling tree species are Rubiaceae =21.85% Annonaceae=13.06%

Percentage of ground cover using Hemi view analysis program were 68.60 at nest while average was 81.70,LAI = 2.713

Density of rattan=0.012 tree/m^2
bamboo=0.008 tree/m^2
salacca=0.001 tree/m^2

-The soil is sandy clay roam.
-The pH is around 6.98-7.56.
-Organic material is rather height (average=4.73,hightest = 6.26).
-Soil moisture is also rather high (average=3.52,highest=7.07)
-The physical soil character might effect to food abundance of Gurney's Pitta,especially earthworms

Research on Gurney's Pitta….

- Distribution → Habitat management
- Nest and Parental care → Propagation
- Microhabitat → Rehabitat, reintroduce

Acknowledgement

1. Darwin Initiative for financial support
2. The Royal Society for the Protection of Birds (RSPB)
3. The Bird Conservation Society of Thailand (BCST)
4. Department of National Park, Wildlife and Plant Conservation of Thailand (DNPWPC)
5. Miss Sirirak Aratrakron field researcher
6. Official from Khao Pra Bang Kram Wildlife Sanctuary

講者簡介

Ms Somying Tanhikorn
泰國國家公園署
富良野生動物研究中心 主任
Director, Phuluang Wildlife Research Center, Department of National Park, Thailand

印尼八色鳥的保育
Pitta Conservation in Indonesia

Pitta Conservation in Indonesia

Dr Nick Brickle
Wildlife Conservation Society
Indonesia Program

Pitta Conservation in Indonesia

- About me
- The Pitta family in Indonesia
- Conservation efforts
- Conservation action
- Understanding the threats
- Conclusions

About me

- Now Program Manager for WCS in Indonesia
- Formerly worked for DEFRA (UK Govt); RSPB (UK NGO), BirdLife International (Vietnam) and more…
- PhD studying ecology of declining songbirds in Europe.

Indonesia

- 17,000 Islands
- 5,185 km km East to West
- 0 - 4,500 m asl
- 17% of the worlds birds

Pittas in Indonesia

- 16 species of Pitta live in Indonesia
- Mostly resident, some migrant (e.g. Fairy Pitta!)
- Some habitat generalists
- Some habitat specialists
- Many threatened by habitat loss and possibly by hunting

Blue-winged Pitta (*Pitta moluccensis*)

- Locally common winter migrant to west.
- Habitat generalist
- Found in gardens and parks as well as forest.

Hooded Pitta (*Pitta sordida*)

- Relatively common resident and apparent internal migrant.
- Forest pitta, but appears to tolerate some disturbance.

Mangrove Pitta (*Pitta megarhyncha*)

- Uncommon resident
- Mangrove specialist
- Found only in coastal Sumatra

Garnet Pitta (*Pitta granatina*)

- Resident in Borneo and Sumatra
- Uncommon specialist of lowland forest
- Likely to be declining nationally due to habitat loss.

Graceful Pitta (*Pitta venusta*)

- Endemic to Sumatra
- Forest of mid-altitudes (600-2000m)
- Forest specialist, does not appear to tolerate disturbance well.
- Little known

Black-crowned Pitta (*Pitta ussheri*)

- Endemic to Borneo
- Forest of mid-altitudes (600-2000m)
- Forest specialist, does not appear to tolerate disturbance well.
- Little known

Banded Pitta (*Pitta guajana*)

- Generally common resident in west.
- Lowland to 1000m
- Habitat generalist
- Forest habitat but tolerates very high disturbance and degradation.

Blue-headed Pitta (*Pitta baudii*)

- Bornean endemic
- Relatively common resident of lowland forest

Blue-Banded Pitta

- *Pitta arquata*
- Bornean endemic
- Hill forest to 1,600m

Giant Pitta (*Pitta caerulea*)

- Rare resident of Sumatra and Borneo
- Lowland forest specialist
- Found only in primary forest
- Little known
- May be threatened?

Schneider's Pitta (*Pitta schneideri*)

- Uncommon Sumatran Endemic
- Montane/sub-montane forest specialist
- Found only in primary forest about 1000m
- Little known

Red-bellied Pitta (*Pitta erythrogaster*)

- Relatively common resident in east
- Forest, but tolerates disturbance and degradation.
- Much regional variation

Elegant Pitta (*Pitta elegans*)

- Relatively common in east.
- Widely distributed with regional variations.
- Forest, but appear to tolerate disturbance in some parts of range.

Ivory-breasted Pitta (*Pitta maxima*)

- Amazing endemic of east Indonesia
- Common where found!
- Forest, but appears very tolerant of disturbance and degradation.

Noisy Pitta (*Pitta versicolor*)

- Austral migrant to southern Papua
- Apparent habitat generalist (at least while wintering)

Fairy Pitta (*Pitta nympha*)

- Winter visitor to Borneo (Oct-Mar)
- Occasionally common in North, but also found to south
- Apparently quite non-specific in habitat, found in a variety of wooded habitats.

Threats to Pittas in Indonesia

Hunting

- Not a big threat
- Pittas make bad pets!
- Caught as 'by catch'
- Sold opportunistically
- Legally protected
- Improve market enforcement main action required

Threats to Pittas in Indonesia

Habitat Loss

- A big threat
- Especially to lowland species and habitat specialists
- However, habitat loss may not have reached critical stage for any species yet

Threats to Pittas in Indonesia

Habitat Loss

- Influence land use planning
- Improve protected area management
- Work with industry
- Use other species..

Understanding the threats to Pittas

- Nature gave birds the power to increase their population..
- Ask why the population is not increasing?
- Somewhere in the lifecycle is a problem
- Where?!

Understanding the threats to Pittas

Conservation of Fairy Pitta?

- Understand exactly where the problem lies, then address it.
- Study the species' ecology until the problem is found, start with the best guess.
- Once the problem is identified (may be more than one..) learn what drives that problem, and go at the drivers.
- Look for examples of where that problem has been solved. Learn from these.
- Measure your impact!!

講者簡介

NICK BRICKLE

Wildlife Conservation Society

PROGRAM MANAGER – INDONESIA PROGRAM

KEY QUALIFICATIONS:

Over ten-years experience of working in conservation; a competent and experienced project manager with well developed skills in policy development and strategic planning. Experience gained from work in both the developing and developed world. At WCS Indonesia responsible for the oversight and delivery of all project activities with a focus on Sumatran projects. Responsible for financial management of all projects. Also involved in the establishment of a regional collaborative training centre to deliver coordinated capacity building in all aspects of conservation and natural resource management and to develop sustainable training systems within relevant government departments.

EDUCATION:

Ph.D., Conservation Science, 1999, University of Sussex, Brighton, UK
B.Sc.(Hons), Zoology, 2:1, 1992, University of Bristol, Bristol, UK

LANGUAGES:

English (native), Indonesian (good)

GEOGRAPHIC EXPERIENCE:

, Indonesia, Europe, UK, Vietnam

PROFESSIONAL EXPERIENCE:

Mar 2004 – present, **Program Manager**, Wildlife Conservation Society – Indonesia Program, Bogor, Indonesia. Responsible for the oversight and delivery of all project activities with a focus on Sumatran projects. Responsible for financial management of all projects. Also involved in the establishment of a regional collaborative training centre to deliver coordinated capacity building in all aspects of conservation and natural resource management and to develop sustainable training systems within relevant government departments..

Feb 1999- Feb 2000, Mar 2002 – Mar 2004, **Senior Biologist**, Department of the Environment, Food and Rural Affairs**,** London, UK. Responsible for policy development and managing and commissioning a research program to investigate the environmental impact of farming techniques. Consensus building with ministers, governmental departments, statutory advisers, NGOs, academia, industry and the public.

Feb 2000 - Mar 2002, **Research Biologist**, Royal Society for the Protection of Birds, Beds., UK. Managing and conducting a project to investigate the decline of Reed Buntings in UK farmland. Including bird, vegetation and invertebrate survey design and data analysis.

Feb 1998 - June 1998, July 2003 - Aug 2003, **Consultant Biologist**, BirdLife International – Vietnam Program**,** Hanoi, Vietnam. Responsible for design and implementation of a training program for Vietnamese scientists in repeatable bird and habitat census methodology. This included surveying Green Peafowl and making recommendations for their conservation.

April 1995 - April 1999, **Research Biologist**, Game Conservancy Trust**,** Hampshire, UK. Investigating the effect of agricultural intensification on the decline of the corn bunting. Work included liaison with farmers and landowners, hiring and training of temporary staff.

July 1992 - June 1993, **Consultant Biologist**, BirdLife International - Indonesia Program**,** Bogor, Indonesia. Led bird and vegetation surveys of Riau and Jambi provinces of Sumatra and Tanimbar Islands, Maluku, Indonesia. Work included project design, leading and training team members in survey techniques and establishing local monitoring.

PROFESSIONAL AFFILIATIONS:

- Member of WPA/BirdLife/SSC Pheasant Specialist Group (2002 – present)
- Member British Ecological Society (2003 – present).

PUBLICATIONS:

Brickle, N.W. and Peach, W. (2004) The breeding ecology of Reed Buntings in farmland and wetland habitats in lowland Britain. *Ibis* 146 (Suppl 2): 69–77.

Boatman, N.D., Brickle, N.W., Hart, J.D., Milsom, T.P., Morris, A.J., Murray, A.W.A., Murray, K.A. and Robertson, P.A. (2004) Evidence for the indirect effects of pesticides on farmland birds. *Ibis* 146 (Suppl 2): 131–143.

Brickle, N.W. (2002) Habitat use, predicted distribution and conservation of Green Peafowl *Pavo muticus* in Dak Lak Province, Vietnam. *Biological Conservation*. 105: 189-197.

Brickle, N.W. & Harper, D.G.C. (2002) Agricultural intensification and the timing of breeding in Corn Buntings *Miliaria calandra*. *Bird Study*. 49: 219-228.

Ewald, J.A. Aebischer, N.J., Brickle, N.W., Moreby, S.J., Potts, G.R. and A. Wakeham-Dawson, (2002). Spatial variation in densities of farmland birds in relation to pesticide use and avian food resources. Chamberlain, D. & Wilson, A. (eds). *Avian Landscape Ecology: pure and applied issues in the large-scale ecology of birds*, Colin Cross Printers Ltd., Garstang, pg 305-312.

Jepson, P., Brickle, N.W. & Cahyadin, Y. (2001) The conservation status Tanimbar Corella and Blue-streaked Lory on the Tanimbar Islands, Indonesia: results of a rapid contextual survey. *Oryx* 35 (3) 224-233.

Brickle, N.W. & Harper, D.G.C. (2000) Habitat use by Corn Buntings *Miliaria calandra* in winter and summer. In Aebischer, N.J., Evans, A.D., Grice, P.V. & Vickery, J.A. (eds) *Ecology and Conservation of Lowland Farmland Birds*: 156-164. British Ornithologists' Union, Tring.

Brickle, N.W, Harper, D.G.C, Aebischer, N.J & Cockayne, S.H. (2000) Effects of agricultural intensification on breeding success of corn buntings *Miliaria calandra* in southern England. *Journal of Applied Ecology*. 37: 742-755.

Brickle, N.W. (1999) Corn buntings, farming and game management. *Game Conservancy Trust Annual Review - 1999*.

Brickle, N.W. (1999) The effect of agricultural intensification on the decline of the corn bunting, Miliaria calandra. DPhil Thesis, University of Sussex.

Bishop, K.D. & Brickle, N.W. (1999) An annotated checklist of the birds of the Tanimbar Islands, Indonesia. *Kukila*. 10: 115-150.

Brickle, N.W. & Harper, D.G.C. (1999) Diet of nestling corn buntings *Miliaria calandra* in southern England examined by compositional analysis of faeces. *Bird Study* 46: 319-329.

Brickle, N.W., Nguyen Cu, Ha Quy Quynh, Nguyen Thai Tu Cuong & Han Van San (1998) The status and distribution of Green Peafowl *Pavo muticus* in Dak Lak Province, Vietnam. *BirdLife International - Vietnam Programme Conservation Report No. 1*. BirdLife International, Hanoi.

Brickle, N.W. (1997) The use of game cover and game feeders by songbirds in winter. In: *Proceedings of the Brighton Crop Protection Conference - Weeds - 1997*, pp 1183-1190. British Crop Protection Council, Farnham.

Brickle, N.W. & Burns, J.E. (1992) Spirit of Sumatra 1992: Status and ecology of the White-winged Wood-duck and Storm's Stork in the Sumatran provinces of Riau and Jambi, Indonesia. Unpublished report to Wildfowl and Wetlands Trust and Asian Wetland Bureau.

湖本村 2004 至 2007 年經繫放八色鳥的再目擊

Reobservation of Banded breeding Fairy Pittas (*Pitta nympha*) in Huben Village, Taiwan, between 2004 and 2007

林瑞興[1,2]、李培芬[2]
Ruey-Shing Lin[1,2] and Pei-Fen Lee[2]

[1]行政院農業委員會特有生物研究保育中心 南投縣集集鎮民生東路 1 號
[2]國立台灣大學生態學與演化生物學研究所 台北市羅斯福路 4 段 1 號

[1] Endemic Species Research Institute, 1 Ming-Shen East Road, Jiji, Nantou, 552, Taiwan
[2] Institute of Ecology and Evolutionary Biology, National Taiwan University, Taipei 106, Taiwan

摘要

繁殖於東亞並可能在婆羅洲度冬的八色鳥爲族群數量不多的易危鳥種，目前有關其戀地性資訊仍幾近空白。本研究藉由 2001, 2004 及 2005 年於雲林縣林內鄉繫放的 152 隻八色鳥的再目擊記錄，呈現八色鳥繁殖地戀地性模式，此外，也分析此行爲在年齡與性別上的差異。2004 至 2007 年於湖本村及其周遭共再目擊上標八色鳥 19 隻次，其中 15 隻次可確認是來自 10 隻特定個體的紀錄。可確認個體的紀錄中僅 1 隻繫放時爲幼鳥(1/99)，其返回比例顯著低於成鳥(9/53)；另 9 隻成鳥中僅 2 隻爲雌鳥，但兩性無顯著差異。成鳥返回的地點與前一年相距約 130m，範圍爲 19-343m，以其推估領域直徑 100-300m 來看，返回地點常在相同領域地點內。湖本村八色鳥成鳥被紀錄的返回比例在 16-26%之間，由於八色鳥生性隱密，此數值應爲一低估值。

Abstract

Information on the strength of site fidelity in the vulnerable Fairy Pitta (*Pitta nympha*) is extremely deficient. In this study, we used resighting records from 152 color-banded Fairy Pittas that were captured in 2001, 2004 and 2005 to index their breeding site fidelity and to compare the differences in return ratios between adults and fledglings, and also between males and females in the Huben Village area of west-central Taiwan. Between 2004 and 2007, we resighted Fairy Pitta with bands 19 times, and of those, ten individuals were identified from fifteen resightings. The return ratio of fledglings (1/99) was significantly lower than it was in the adults (9/52). Among nine adults, only two were female. However, the difference between the two genders was not significant. The mean distance between banded and resighted positions was around 130m, ranging from 19-300m. Since the diameters of the various Fairy Pittas' territories also ranged from 100-300m, it indicated that adults

often returned to sites close to or in their original territories. The return rate of adults in Huben Village was around 16-26%. However, this value has probably been underestimated because of their secretive habits.

前言

遷徙性成年鳥類回到前一年繁殖地點的傾向稱之為繁殖地戀地性(breeding site-fidelity)，而幼鳥回到出生地繁殖的傾向則稱為出生地戀地性(natal philopatry)。戀地性可藉由促進或限制基因交流(Comins et al. 1980)、避免雜交(Greenwood and Harvey 1976; Daniels and Walters 2000)、維持隔離族群及 source-sink 族群動態(Payne 1991)等機制決定鳥類地理範圍的分布與族群結構(Brown and Kodric-Brown 1977; Freemark et al. 1995; Wheelwright and Mauck 1998)。因此物種擴散動態的資訊對於物種保育、經營管理及復原(restoration)成效的評估都有相當的助益(Sauders et al. 1991; Fahrig and Merriam 1994)。

許多研究指出遷徙性燕雀目鳥類(passerines)之成鳥常具有強烈的繁殖地戀地性；相對地，幼鳥出生地戀地性則非常低(Greenwood 1980, Greenwood and Harvey 1982, Gavin and Bollinger 1988, Porneluzi 2003)。此種現象除了顯示候鳥具有良好的定位能力外，也暗示對於成鳥回到相同地點繁殖具有強烈的演化上的好處，但對於幼鳥則否。關於影響鳥類繁殖地戀地性的強弱已有許多假設被提出。其中，最常為研究者提及的是「前一繁殖季的經驗」(Haas 1998, Hoover 2003)，亦即成功的繁殖者較失敗的繁殖者有更高的返回比例。「棲地或領域的品質」也是影響成鳥是否返回原繁殖地的可能原因之一(Bollinger and Gavin 1989)。此外，某些鳥類的「年齡」與返回比例高低有關(Greenwood and Harvey 1982)，通常年長者返回比例較高，年輕者或因競爭領域及繁殖機會的能力較弱，傾向於往他處擴散(McCleery and Perrins 1989, Badyaev and Faust 1996, Lozano and Lemon 1999)。最後，戀地性在「性別」之間常有顯著差異，通常雄性較為強烈(e.g. Payne and Payne 1993, Lemon et al. 1996, Murphy 1996)。

關於遷徙性燕雀目鳥類戀地性的研究，固然已累積為數不少的資訊，但相關研究的地理分布明顯地集中於溫帶的北美及歐洲地區，相較之下，對於棲居於亞洲的鳥類，其相關資訊仍亟待補充。八色鳥科(Pittidae)鳥種主要分布於東南亞，該科 30 種中，有 4 種屬於長距離遷徙鳥種，分別是 African Pitta、Indian Pitta、Blue-winged Pitta 及 Fairy Pitta，另有少數種類，如 Hooded Pitta、Blue Pitta、Noisy Pitta 及 Red-bellied Pitta 等會進行短距離遷徙或會有固定的移動，但移動模式仍不清楚(Erritzoe 2003)。整體而言，有關八色鳥科的行為生態研究可說是極端缺乏，許多行為特性仍僅止於軼事般的描述。雖說證據仍如鳳毛麟角，但就有限的觀察結果來看，八色鳥科鳥種應具有領域性，此外，Blue-winged Pitta 曾被至少連續 5 年於相同繁殖地點繫放(McClure 1974)，Hooded Pittas (Medway and Wells 1976)及 Afican Pittas (Rathbun 1978) 在度冬地也曾連續

2 年或以上被紀錄的情形來看，至少部分八色鳥科鳥種具有繁殖地及度冬地的戀地性。

八色鳥(*Pitta nympha*)是 4 種具長距離遷徙能力的八色鳥科鳥種中族群數量最少的一種，數量估計僅約數千隻至一萬多隻之間，屬於易危(Vulnerable)等級保育鳥類，其繁殖區包括台灣、日本南方、韓國南方、中國東南方等地，另目前有限的資料顯示其度冬地可能是在婆羅洲(Borneo) (Lambert and Woodcock 1996, Birdlife International 2001)。關於八色鳥的繁殖地戀地性，目前僅知 1994 年在高雄美濃雙溪熱帶母樹園一繫放之母鳥，曾於次年返回原繁殖地附近生殖(Birdlife International 2001)，故有關八色鳥戀地性及其擴散動態之證據仍幾近空白。2001 年開始，我們於雲林縣進行一連串的八色鳥相關研究，本研究為利用 2001、2004 及 2005 年於雲林縣繫放之成、幼鳥共 152 隻的後續再目擊資料，呈現八色鳥成鳥繁殖地及幼鳥出生地戀地性的模式，同時也針對再目擊個體的移動模式進行分析。

材料與方法

捕捉 2001, 2004 及 2005 年 4 月下旬至 8 月上旬，我們於雲林縣進行八色鳥成鳥及巢中雛鳥的捕捉繫放。2001 年工作範圍包括林內鄉與斗六市北緣的丘陵地，2004 及 2005 年則僅於林內鄉湖本村進行(**圖 1**)。成鳥以架設於經常活動地點或巢前之霧網(mist nets)加以捕捉；雛鳥則於 7 日齡至離巢前徒手捕捉。所有捕獲的八色鳥，右腳均繫以一標有數字的鋁環及 1 色環，左腳另繫以 2 個色環，每隻個體均具有不同的顏色組合。此外，亦測量形值及自翼下肱骨靜脈採取微量血液。完成上述工作後，隨即於原地放飛或置回巢內。部分採得的血液於萃取 DNA 後，以判讀 CHD 基因片段的方式確認性別(Griffith et al. 1998; Fridolfsson and Ellegren 1999)。捕捉的地點以衛星定位儀(eTrex Summit, GARMIN Corporation, Hsichih, Taipei, Taiwan)確認或參考 1/5000 相片基本圖來定位。

再目擊 主要之再目擊記錄來自於 2004-2007 年於湖本村執行之八色鳥分布調查。為進行上述調查，我們將湖本村以 200x200m 方格劃分之，並於每年 4 月底至 5 月底以錄放反應法(playback)於每個方格中心進行 3 次調查，每次調查約間隔 10 日。調查時調查人員播放八色鳥叫聲 5min，若有八色鳥反應則記錄其出現之距離與方位角，此時，部分八色鳥會飛出接近喇叭，若可清楚目擊，調查人員也記錄其是否為上有腳環的個體及其色環顏色組合。詳細之八色鳥錄放反應調查法描述請見 Lin *et al.* (2007)。除固定調查所得的再目擊記錄外，若有賞鳥人士於本區發現有腳環之個體並攝得照片，即詢問其觀察的時間與地點。

結果

捕捉數量 2001, 2004 及 2005 年我們於研究範圍內繫放八色鳥成鳥 53 隻，

31 巢成功離巢幼鳥 99 隻，合計 152 隻(**圖 1**)。另經判定性別的成鳥有 40 隻，其中雌鳥 17 隻、雄鳥 23 隻；判定性別的雛鳥僅 15 隻，雌鳥 7 隻，雄鳥 8 隻。

再目擊與移動模式 2004 至 2007 年我們於湖本村僅再目擊 19 隻次曾被繫放的八色鳥，各年數量分別爲 2004 年 0 隻、2005 年 8 隻、2006 年 6 隻及 2007 年的 5 隻(**圖 2**)。19 隻次中有 4 隻因光線或目擊時間限制，未能確認色環編號，其餘 15 隻次可清楚識別色環，並確認是來自 10 隻個體的紀錄，10 隻個體中有 7 隻於再繫放後僅再被目擊 1 次，1 隻有 2 年被目擊，另有 2 隻則在 2005 至 2007 年連續被目擊出現在湖本村。

2001 年在湖本村範圍外繫放的 40 隻個體(成鳥 10 隻、幼鳥 30 隻)，於 2004 至 2007 年的再目擊率很低，僅有 1 成鳥、1 幼鳥各 1 次的紀錄。幼鳥在 2001/6/17 於湖本村北方的林中村丘陵繫放，6 年後(2007/6/16)於湖本村繁殖時被再次目擊，出生地與繁殖地相距 2,742m (**圖 3**)。此鳥爲雌鳥。另此筆記錄也是 99 隻繫放幼鳥中唯一再被目擊的，雖然不確定雛鳥由離巢後至次年飛抵繁殖地的存活率，此資料仍顯示雛鳥返回出生地的比例很低。成鳥則是於 2001/5/1 在湖本村北側的林茂村被繫放，於 2006/5/23 日再目擊於距捕捉地點僅 137m 的位置(**圖 3**)，此時其年齡已至少有 6 歲。這 2 隻是目前記錄年齡最長的個體。

2004 年於湖本村範圍內我們共繫放 66 隻個體(成鳥 25 隻、幼鳥 41 隻)，於 2005 至 2007 年間，我們確認其中至少 7 隻成鳥再返回湖本村，其中 6 隻在次(2005)年、1 隻在 2006 年首次再目擊。上述 7 隻個體僅 2 隻爲雌鳥。另有 2 隻雄鳥連續於 2005 至 2007 年返回湖本村，1 隻雌鳥於 2006 至 2007 年被記錄。相較於 2004 年繫放之個體，2005 年於湖本村繫放的 46 隻個體(成鳥 18 隻、幼鳥 28 隻)，在 2006 至 2007 年的觀察中，僅於 2006 年再目擊 1 隻雄成鳥。總計 9 隻繫放成鳥、14 次再目擊的距離在 19-343m 之間，平均距離±SD 爲 138±97.9m，中數爲 128m。若考慮部分個體重複目擊效應，則 9 隻個體再目擊距離中數 131m、平均距離±SE 爲 134±47.9m、範圍 71-225m (**圖 4**)。

年齡與性別差異 成鳥在繫放後次年或多年後再返回原棲地且被目擊的比例並不高，以在湖本村內被繫放的 43 隻成鳥來看，即便將 4 隻未確認個體的記錄歸類爲成鳥，成鳥返回並被目擊的比例也僅 26%，而在未計算無法確認個體情況下，比例降爲 16%。雖說如此，成鳥返回並被目擊的比例仍顯著高於幼鳥(0/63；Pearson Chi-squre = 10.264, df =1, p = 0.001)。另雖然湖本雄成鳥(7 隻)返回並被目擊的數量雖比雌鳥(2 隻)多，但差異並不顯著(Pearson Chi-squre = 1.343, df =1, p = 0.25)。

討論

八色鳥科鳥類的戀地性資訊仍相當缺乏，本研究提供了其中唯一於台灣繁殖的八色鳥(*Pitta nympha*)的戀地性基礎資訊。初步的研究結果顯示部分八色鳥成鳥確實會返回原繁殖地，但幼鳥再次出現於出生地的機會則非常低，此模式與「年齡」假說(McCleery and Perrins 1989, Badyaev and Faust 1996, Lozano and Lemon 1999)的預期相符。另我們也檢視性別對返回率的影響，但結果顯示兩性

之間並無明顯差異，不過本研究的樣本數仍低，同時野外現況也令我們難以觀測所有返回的八色鳥，故有關雌、雄成鳥的戀地性程度與移動模式的差異，仍待更完整的研究。

本研究發現八色鳥成鳥返回並被記錄的比率在 16-26%之間，此數值相較於森林及灌叢遷徙燕雀目鳥類的平均值(~46%)來得低(Green 1992, Johnson and Geupel 1996, Gardali et al. 2000)。較低的返回率固然可能反應事實，但也可能因為調查的困難而導致低估。成鳥再目擊率與其越冬及遷徙存活率、戀地性強弱、再觀察的難易度(Jones et al. 2007)及調查涵蓋的地點(Sandercock 2006)有關。在未能得知死亡率及偵測度，同時調查地區未做適當擴增的情形下，成鳥返回比例顯然會被低估。針對像八色鳥這類生性較為隱密的鳥種而言，偵測度不高更是一必然的難題，以 2004-2007 年湖本村的調查為例，僅約 20%的調查記錄為目擊所得(Lin, unpublished data)，而即便有 20%的目擊機會，也未必可看清楚腳環組合。如是，我們相信本研究 16-26%的返回率實為低估的數值。繫放與再目擊資料為推估越冬死亡率的基礎，而死亡率高低對物種族群動態及變動趨勢有重要影響，但因目前的再目擊率誤差較大，我們也就未利用 mark-recapture 統計方法(Sandercock 2006)進行存活率估算。為進一步探討八色鳥族群動態，目前遭遇的困難將是未來研究必須突破的課題。

謝誌

本研究由衷感謝劉寶華、黃國維、池文傑、張景開、蘇美如、陳清圳、黃永慶及張心怡等人在野外工作及 Dr. Herman Mays Jr.在性別鑑定上的協助。另也感謝林務局及經濟部水利署中部水資源局在經費上的協助，與農委會同意進行繫放研究(農林字第 0900109856、農授林務字第 0941606084 號及 0951604952 號)

引用文獻

Badyaev, A. V., and J. D. Faust. 1996. Nest site fidelity in female Wild Turkey: Potential causes and reproductive consequences. Condor 98: 589-594.

BirdLife International. 2001. Threatened birds of Asia: The BirdLife International Red Data Book. BirdLife International, Cambridge, UK.

Bollinger, E. K., and T. A. Gavin. 1989. The effects of site quality on breeding-site fidelity in Bobolinks. Auk 106:584-594.

Brown, J. H., and A. Kodric-Brown. 1977. Turnover rates in insular biogeography: Effect of immigration on extinction. Ecology 58:445-449.

Comins, H. N., W. D. Hamilton, and R. M. May. 1980. Evolutionary stable dispersal strategies. Journal of Theoretical Biology 82:205-230.

Daniels, S. J., and J. R. Walters. 2000. Between-year breeding dispersal in Red-cockaded Woodpeckers: Multiple causes and estimated cost. Ecology 81:2473-2484.

Erritzoe, J. 2003. Family Pittidae (Pittas). Pages 106-161 *in* J. de Hoyo, A. Elliott, and D. A. Christie, editors. Handbooks of the birds of the world, Vol. 8. Broadbills to Tapaculos. Lynx Edicions, Barcelona, Spain.

Green, M. T. 1992. Adaptations of Baird's Sparrows (*Ammodramus bairdii*) to grasslands: acoustic communication and nomadism. Dissertation. University of North Carolina, Chapel Hill, USA.

Fahrig, L., and G. Merriam. 1994. Conservation of fragmented populations. Conservation Biology 8:50-59.

Freemark, K. E., J. B. Dunning, S. J. Hejl, and J. R. Probst. 1995. A landscape ecology perspective for research, conservation, and management. Pages 381-427 *in* T. E. Martin and D. M. Finch, editors. Ecology and Management of Neotropical Migratory Birds. Oxford University Press, New York, USA.

Fridolfsson, A.-K., and H. Ellegren. 1999. A simple and universal method for molecular sexing of non-ratite birds. Journal of Avian Biology 30 116-121.

Gardali, T., G. Ballard, N. Nur, and G. R. Geupel. 2000. Demography of a declining population of Warbling Vireos in coastal California. Condor 102:601-609.

Gavin, T. A., and E. K. Bollinger. 1988. Reproductive correlates of breeding-site fidelity in Bobolinks (*Dolichonyx oryzivorus*). Ecology 69:96-103.

Greenwood, P. J. 1980. Mating systems, philopatry, and dispersal in birds and mammals. Animal Behaviour 28:1140-1162.

Greenwood, P. J., and P. H. Harvey. 1982. The natal and breeding dispersal of birds. Annual Review of Ecology and Systematic 13:1-21.

Haas, C. A. 1998. Effects of prior nesting success on site fidelity and breeding dispersal: An experimental approach. Auk 115:929-936.

Hoover, J. P. 2003. Decision rules for site fidelity in a migratory bird, the Prothonotary Warbler. Ecology 84:416-430.

Johnson, D. H., and G. R. Geupel. 1996. The importance of productivity to the dynamics of a Swainson's Thrush population. Condor 98: 133-144.

Jones, S. L., J. S. Dieni, M. T. Green, and P. J. Gouse. 2007. Annual return rates of breeding grassland songbirds. The Wilson Journal of Ornithology 119:89–94.

Lambert, F., and M. Woodcock. 1996. Pittas, Broadbills an Asities. Pica Press, Sussex, UK.

Lemon, R. E., L. Perreault, and G. A. Lozano. 1996. Breeding dispersions and site fidelity of American Redstart (*Setophaga ruticilla*). Canadian Journal of Zoology 74:2238-2247.

Lin, R.-S., P.-F. Lee, T.-S. Ding, and Y.-T. K. Lin. 2007. Effectiveness of playbacks in censusing the Fairy Pitta (*Pitta nympha*) during the breeding season in Taiwan. Zoological Studies 46:242-248.

Lozano, G. A., and R. E. Lemon. 1999. Effects of prior residence and age on breeding performance in Yellow Warblers. Wilson Bulletin 111:381-388.

McCleery R. H.,and C. M. Perrins 1989. Great Tit. Pages 35–54 *in* I. Newton, Editor. Lifetime Reproduction in Birds. Academic Press, London, UK.

McClure, H. E. 1974. Migration and survival of the birds of Asia. USA Army Component SEATO Medical Research Laboratory, Bangkok, Thailand.

Medway, L., and D. R. Wells. 1976. The birds of the Malay Peninsula. Vol. V: Conclusions, and survey of every species. Witherby, London.

Murphy, M. T. 1996. Survivorship, breeding dispersal and fidelity in Eastern Kingbirds. Condor 98:82-92.

Payne, R. B. 1991. Natal dispersal and population structure in a migratory songbird, the Indigo Bunting. Evolution 45:49-62.

Payne, R. B., and L. L. Payne. 1993. Breeding dispersal in Indigo Bunting: Circumstances and consequences for breeding success and population structure. Behavioral Ecology 9:64-73.

Porneluzi, P. A. 2003. Prior breeding success affects return rates of territorial male Ovenbirds. Condor 105:73-79.

Rathbun, G. B. 1978. The Afican Pitta at Gede Ruins, Kenya. Scopus 2:7-10.

Sandercock, B. K. 2006. Estimation of demographic parameters from live-encounter data: a summary review. Journal of Wildlife Management 70:1504-1520.

Sauders, D. A., R. J. Hobbs, and C. R. Margules. 1991. Biological consequences of ecosystem fragmentation: A review. Conservation Biology 5:18-32.

Wheelwright, N. T., and R. A. Mauck. 1998. Philopatry, natal dispersal, and inbreeding avoidance in an island population of Savannah Sparrows. Ecology 79:755-767.

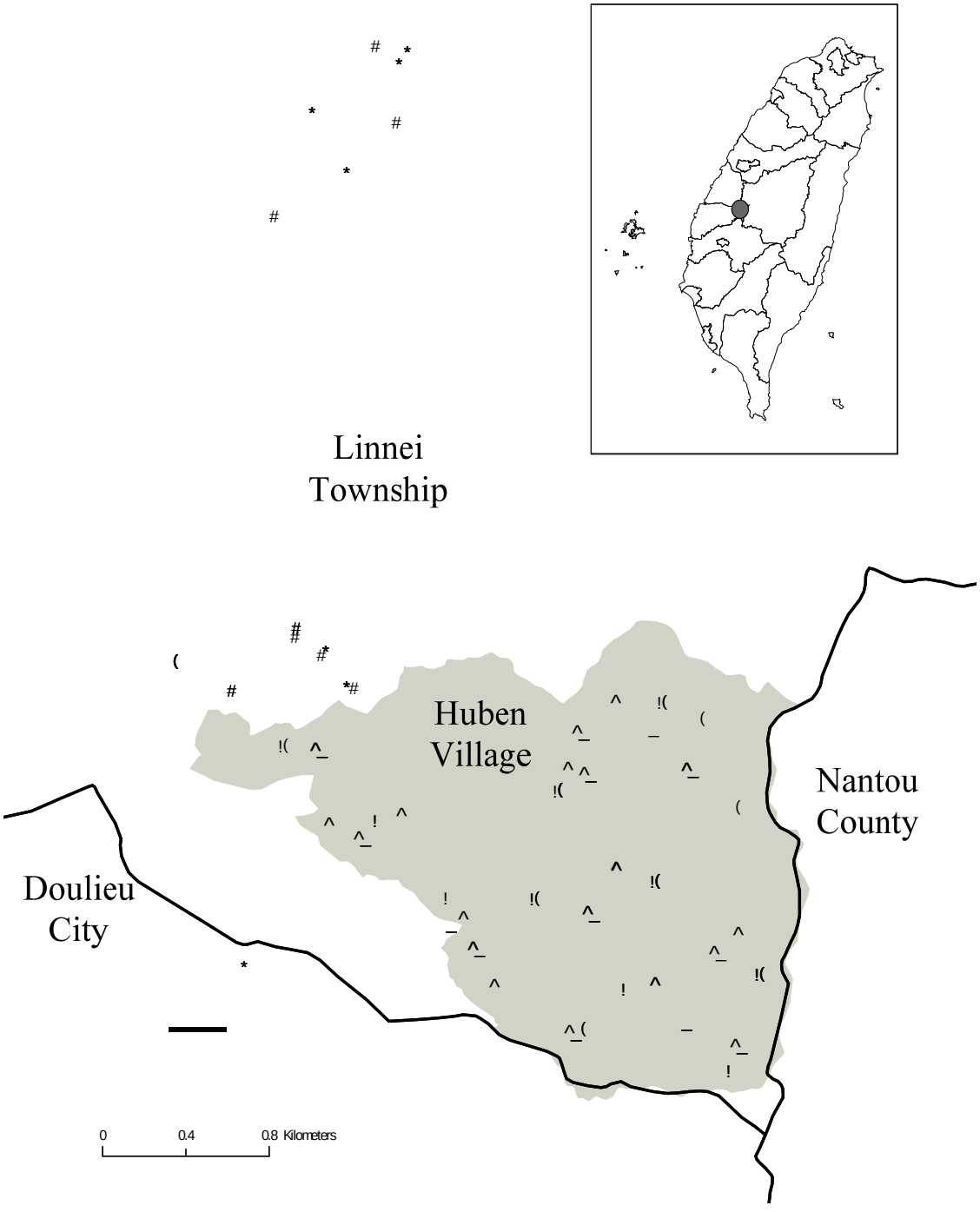


圖 1. 研究地點位置及 2001 (三角形)、2004 (星形)與 2005 (圓點)年繫放之八色鳥成鳥(實心)與幼鳥(空心)之分布。

Fig. 1. Map shows the location of study area and spatial distribution of the banded adults (black labels) and the fledglings (hollow labels) of Fairy Pittas at 2001 (triangels), 2004 (stars) and 2005 (dots).

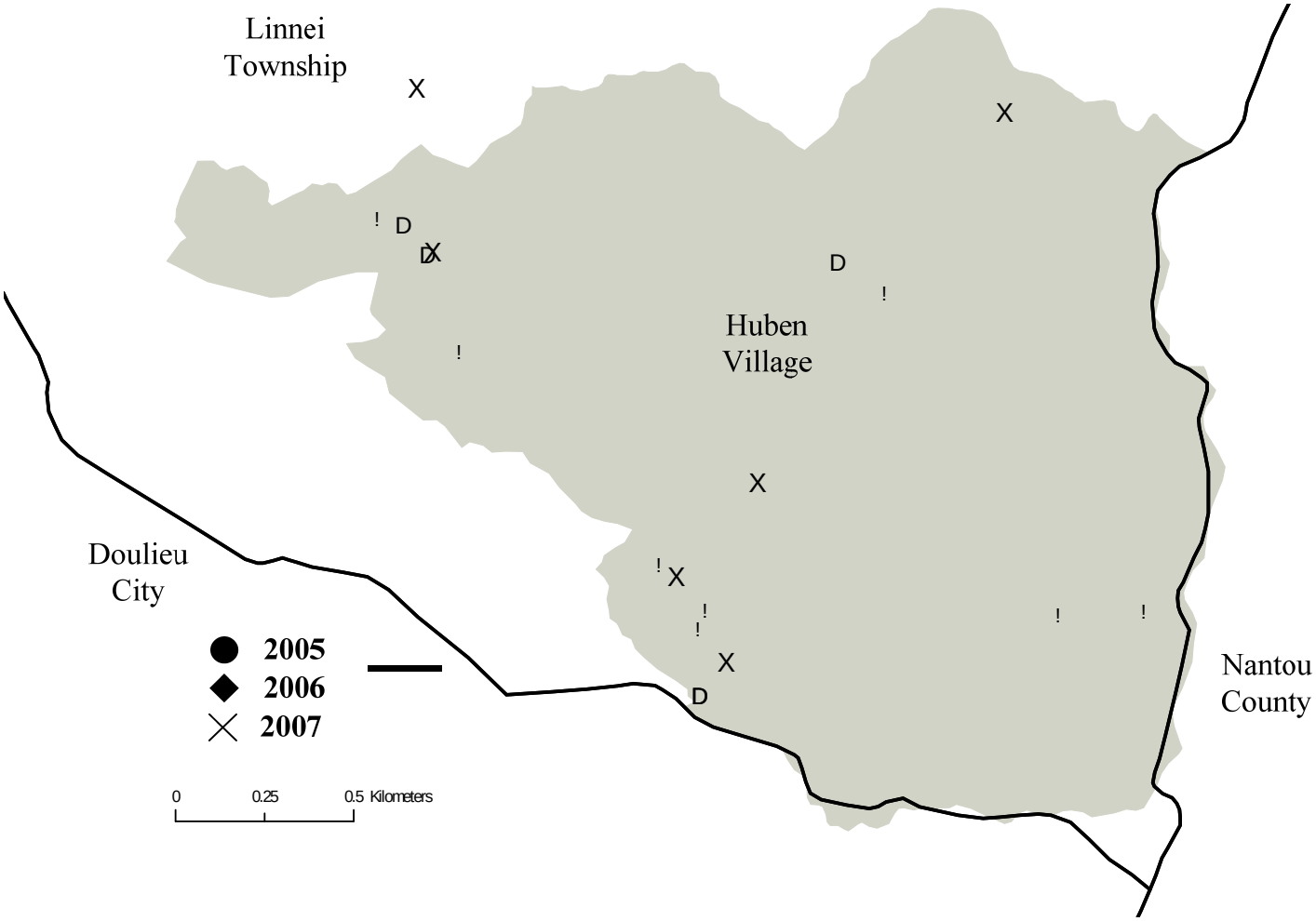


圖 2. 湖本村 2005-2007 年 19 次八色鳥再目擊地點分布。

Fig. 2. Locations of the 19 resightings of Fairy Pittas in Huben Village between 2005 and 2007.

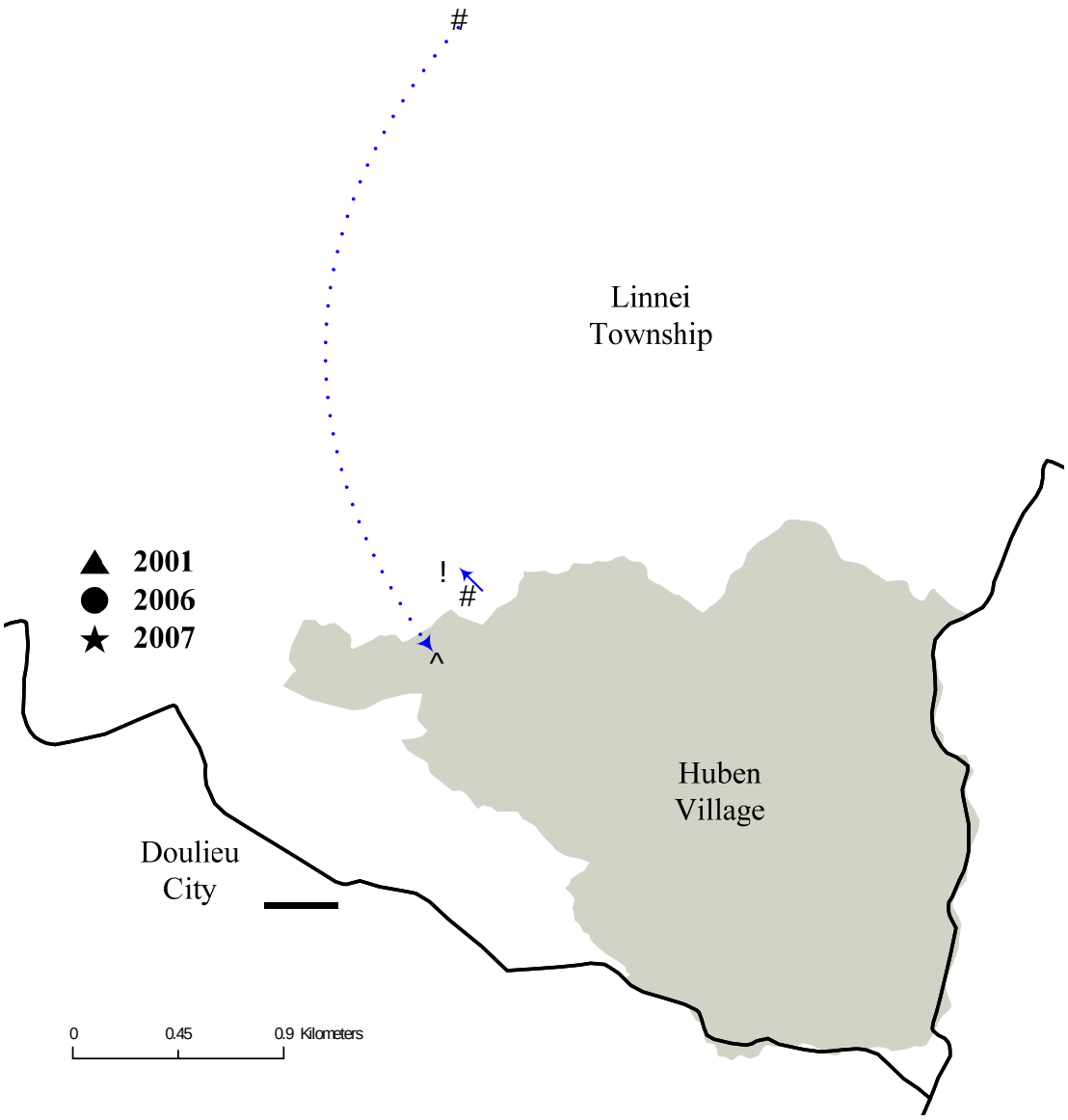


圖 3. 雲林縣林內鄉 2001 年繫放後再被目擊的 2 隻八色鳥的分布與移動模式。虛線代表唯一幼鳥繫放後再被目擊個體的移動。箭頭表示移動方向。

Fig. 3. Spatial distribution and movements of the two resighted Fairy Pittas that were banded in 2001 in Linnei Township, Yunlin County. Dash line indicated the movement of the only resighted banded fledgling. Arrows represented directions.

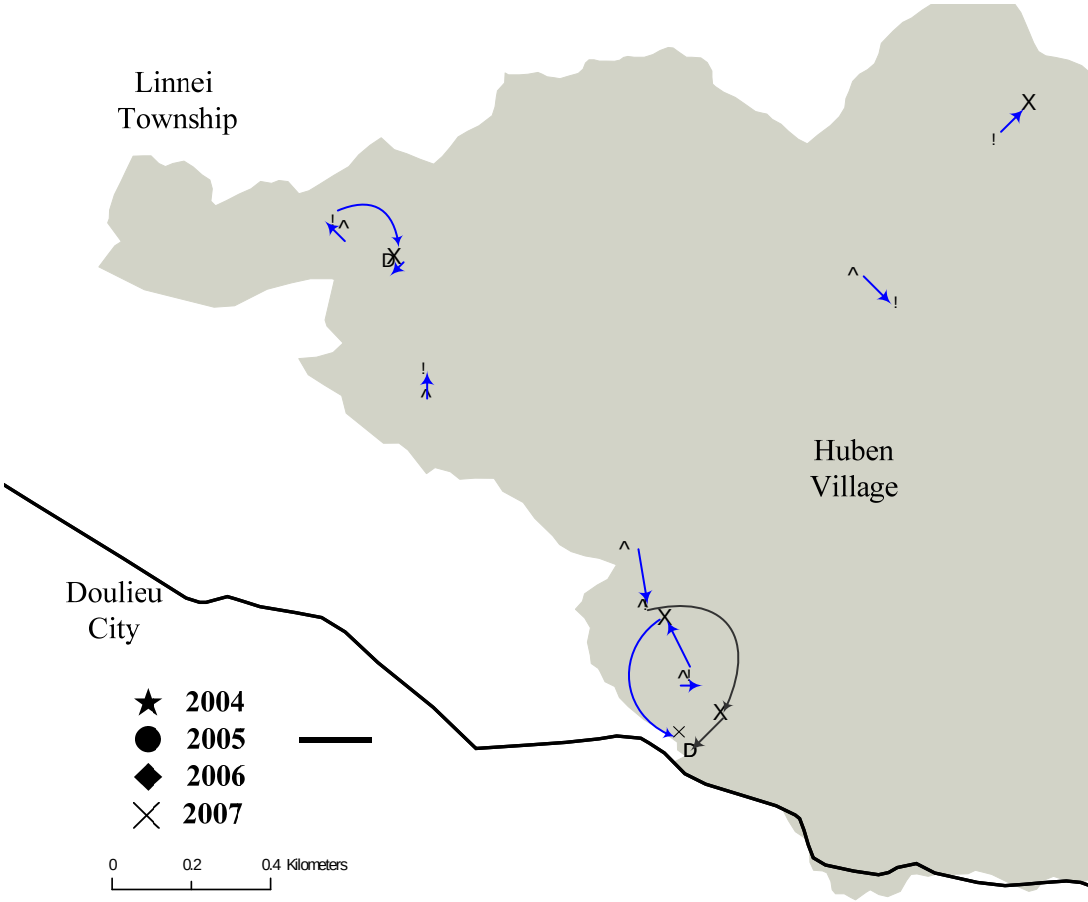


圖 4. 湖本村 2004-2005 年繫放後再被目擊的 9 隻八色鳥成鳥的分布與移動模式。箭頭表示移動方向。

Fig. 4. Spatial distribution and movements of the nine resighted adult Fairy Pittas that were banded between 2004 and 2005 in Huben Village, Taiwan. Arrows represented directions.

八色鳥的繁殖與天敵 - 以湖本村為例

The Impact of Nest Predators on the Nesting Success of the Vulnerable Fairy Pitta *Pitta nympha* in Huben Village, Taiwan

陳宛均[1]、林瑞興[1,2]、李培芬[1]

[1]國立台灣大學生態學與演化生物學研究所

[2]行政院農委會特有生物研究保育中心

摘要

台灣為八色鳥重要的繁殖地，而繁殖成功率將會左右八色鳥的族群大小，影響繁殖成功率最主要的原因是天敵掠食。為了解八色鳥在台灣的繁殖與天敵掠食壓力，以利後續的八色鳥族群研究保育工作，我們於 2006 年繁殖季在台灣中部的雲林縣林內鄉湖本村進行其繁殖及鳥巢天敵調查。該年於湖本村共發現 30 個八色鳥巢，以 Mayfield estimator 估計八色鳥繁殖成功率為 50.5±0.7%（16 個成功離巢，總觀察天數 452 天）。另使用 24 小時數位監視錄影拍攝八色鳥鳥巢繁殖狀況，發現的其巢天敵有哺乳類、螞蟻與蛇類等三個類型，組成包括台灣獼猴 (*Macaca cyclopsis*)、食蟹獴 (*Herpestes urva*)、鼬獾 (*Melogale moschata subaurantiaca*)、螞蟻、紅斑蛇 (*Dinodon rufozonatum*)、茶班蛇 (*Psammodynastes pulverulentus*)、赤背松柏根 (*Oligodon formosanus*) 與南蛇 (*Ptyas mucosus*)，其中蛇類為八色鳥最主要的天敵。

Abstract

Taiwan is the most important breeding area for the Fairy Pitta *Pitta nympha*. The nest survival rate does affect the population quantity, and predation is a primary cause of nest mortality. In order to determine the nest predation risk to the Fairy Pitta, we monitored nesting success and identified nest predators in Huben Village, Linnei Township, Yunlin County in west-central Taiwan during the 2006 breeding season. In total, we monitored 30 nests in 2006 and the nest survival rate was 50.5±0.7% (16 successful nests, 452 observation days). This was calculated with the use of the Mayfield estimator. We continuously monitored nests by digital video systems. Nest predators included mammals, ants and snakes. The predators were Formosan Macaque (*Macaca cyclopsis*), Crab-eating mongoose (*Herpestes urva*), Formosan ferret-badger (*Melogale moschata subaurantiaca*), ants, Red-banded snake (*Dinodon rufozonatum*), Mock viper (*Psammodynastes pulverulentus*), Taiwan Leopard Snake

(*Oligodon formosanus*), and Dhaman rat snake (*Ptyas mucosus*). Among the predators, snakes were the major predators of the Fairy Pitta.

前言

台灣為八色鳥 (*Pitta nympha*) 重要的繁殖地，每年 4 月中旬至 9 月八色鳥由度冬區飛到台灣來繁殖後代 (Lin *et al.* 2007) 。然而鳥類的繁殖成功率左右著鳥類族群的大小。影響鳥類繁殖成功率的因子很多，包括了孵化失敗、他種鳥類的托卵寄生 (parasitism)、親鳥死亡、親鳥棄巢、天敵掠食 (predation) 以及短期的氣候變動。其中天敵掠食是導致大多數鳥類繁殖失敗的主因 (Ricklefs 1969 , Martin 1996)。因此，必須先了解八色鳥的繁殖特性與天敵組成，才能有效的針對八色鳥族群進行保育工作。

生殖生物學研究

為了解八色鳥在台灣的繁殖狀況，本研究於 2006 年 5 月 3 日起，至 2006 年 7 月 30 日在雲林縣林內鄉湖本村境內（圖 1），進行八色鳥鳥巢的搜尋定位與追蹤其繁殖狀態（圖 2）。研究期間總共記錄到 30 個八色鳥鳥巢，其中有出現鳥蛋與幼鳥者共 26 巢。八色鳥的繁殖時期可以分為築巢期 (building)、產卵期 (laying)、孵卵期 (incubation) 以及育雛期 (nestling)。八色鳥的產卵期為 3－5 天，每巢平均蛋數 4.6±0.1 個（n=17）；孵卵期平均為 14 天，孵化率為 88.1％；每巢幼鳥數 4.0±0.2 隻（n=12）；平均育雛期為 13 天，每巢離巢幼鳥數 3.4±0.3 隻（n=16）。使用 Mayfield estimator 進行八色鳥繁殖成功率估算結果，2006 年的八色鳥繁殖成功率為 50.5± 0.7％（16 個成功離巢，總觀察天數 452 天）。其中天敵 (72.7%, n=8) 為造成八色鳥繁殖失敗最主要的原因，其次方是人為影響。

八色鳥天敵研究

過去的鳥類天敵研究，多半僅能以鳥巢遺跡、屍體咬痕或是利用設置人工鳥巢，在鳥巢中放置假蛋，由假蛋上的齒痕或喙痕推測間接得知。鮮少有直接觀察獲得天敵的影像資料的研究。為了獲得確切的天敵掠食鳥巢資料，本研究採用 24 小時不間斷的數位錄影，日夜拍攝鳥巢的繁殖狀況，透過拍攝到的天敵掠食畫面與鳥巢遺跡，進行鳥巢天敵物種判定。結果發現在湖本地區繁殖的八色鳥所遭遇到的天敵有哺乳類、螞蟻與蛇類等三個類型。

哺乳類

哺乳類天敵目前記錄到台灣獼猴 (*Macaca cyclopsis*)、食蟹獴 (*Herpestes urva*) 以及鼬獾 (*Melogale moschata subaurantiaca*)。其中較為特別的是台灣獼猴

(*Macaca cyclopsis*) 常會將鳥巢整個扯開，因此被台灣獼猴掠食過的鳥巢常具有巢材散落一地的特色。

螞蟻

螞蟻的掠食方式是以將鳥蛋或幼鳥撕裂成碎屑分批緩慢的搬走，整個掠食的過程十分冗長，會持續一至三天，直到整個巢被搬空為止。目前螞蟻找到鳥巢的機制不明。由於研究的攝影畫面解析度不足，無法判斷螞蟻種類與其是否為主動攻擊鳥巢，僅能推測是當蛋有裂縫或巢中幼鳥死亡散發出氣味，而吸引螞蟻前來掠食。

蛇類

蛇類掠食的對象除了鳥蛋，也包含幼鳥，且當幼鳥的體型越大，蛇需要花費吞食幼鳥的時間越多，會長達 1-2 小時；也常發生幼鳥體型過大，蛇類無法吞下，卻仍造成幼鳥窒息死亡的狀況。研究期間有一巢八色鳥幼鳥，經過紅斑蛇 (*Dinodon rufozonatum*) 吞食了一隻幼鳥 (圖 3A)，另造成一隻幼鳥死亡，最後由於幼鳥數目減少，親鳥餵食次數開始銳減，最後棄巢導致剩下的幼鳥餓死。亦記錄到茶班蛇 (*Psammodynastes pulverulentus*) 夜間掠食八色鳥鳥巢，卻因幼鳥體型過大，茶斑蛇吞食不下，造成三隻八色鳥幼鳥窒息死亡，隔日清晨親鳥將幼鳥屍體叼出丟棄，最後此巢尚有兩隻幼鳥順利離巢。

赤背松柏根 (*Oligodon formosanus*) 掠食遺跡相當特殊，會留下像開罐器開過的缺口蛋殼，其利用特化的上頷齒劃開革質的蛋，再將頭伸入蛋殼內食用蛋液 (圖 3B)。此外，亦記錄到南蛇 (*Ptyas mucosus*) 分批掠食鳥巢的紀錄，研究過程中有兩巢八色鳥的鳥蛋即是被南蛇分批掠食清光的 (圖 3C)。

近年的研究開始使用攝影監視技術，發現蛇類 (29%) 其實是熱帶、亞熱帶地區重要的鳥巢天敵物種 (Stake *et al.* 2005, Staller *et al*. 2005)。在本研究記錄到蛇的種類與數量也占天敵總量中相當比例。而根據研究結果，顯示蛇類是八色鳥在繁殖時期最主要的掠食者。

結語

亞熱帶地區截至目前為止很少有人進行有系統的鳥巢的天敵研究，尤其是在包括台灣的東亞區域，更是缺乏針對鳥巢進行長期監測攝影記錄的研究。本研究針對八色鳥繁殖監測的結果，將有助於了解台灣八色鳥繁殖狀況與所面臨的天敵掠食壓力，亦可對於八色鳥保育工作提供重要的資訊。

致謝

八色鳥的天敵研究是一件艱困的工作，所幸在研究過程中獲得許多人的協助與支持，研究才能得以順利進行。其中要特別感謝張景開先生，若是缺少其對八色鳥豐富的經驗與了解，八色鳥研究絕對是無法順利完成；此外，亦由衷的感謝池文傑、曾旭良、辜瑞源、張心怡與陳嘉宏等所有曾經在湖本村協助研究的伙伴們，以及台大空間生態研究室的支持。另感謝政府部門許多單位提供不同類型研究經費，這些機構包括行政院農委會、林務局、經濟部水利署中部水資源局以及國家科學委員會。

參考文獻

1. 林瑞興。2006。95 年斗六丘陵(包括湖山水庫)八色鳥族群數量調查。經濟部水利署中區水資源局。台中。
2. 陳宛均。2007。臺灣中部低海拔森林燕雀目鳥種灌叢巢與地面巢的天敵掠食風險 國立台灣大學生態學與演化生物學研究所碩士 論文。
3. Lin, R. S., C. T. Yao, and P. F. Lee. 2007. The diet of Fairy Pitta *Pitta nympha* nestlings in Taiwan as revealed by videotaping. Zoological Studies 43:355-361.
4. Martin, T. E. 1996. Life history evolution in tropical and south temperate birds: What do we really know? Journal of Avian Biology **27**:263-272.
5. Martin, T. E.,C. Paine, C. J. Conway, W. M. Hochachka, P. Allen, and W. Jenkins. 1997. BBIRD field protocol. Montana Cooperative Wildlife Research Unit, University of Montana, Missoula.
6. Mayfield, H.F. 1961. Nesting success calculated from exposure. Wilson Bulletin 73:255–261.
7. Mayfield, H. F. 1975. Suggestions for calculating nest success. Wilson Bulletin 87:456–466.
8. Ricklefs, R. E. 1969. An analysis of nesting mortality in birds. Smithsonian Contributions to Zoology 9:1-48.
9. Severinghaus, L. L., C. T. Liang, S. R. Severinghaus, and L. C. Lo. 1991. The distribution, status and breeding of Fairy Pitta (*Pitta nympha*) in Taiwan. Bulletin of the Institute of Zoology, Academia Sinica 30: 41-47.
10. Stake, M. M., F. R. Thompson III, J. Faaborg, and D. E. Burhans. 2005. Patterns of snake predation at songbird nests in Missouri and Texas. Journal of Herpetology 39:215-222.
11. Staller, E. L., W. E. Palmer, J. P. Carroll, R. P. Thornton, and D. C. Sisson. 2005. Identifying predators at northern bobwhite nests. Journal of Wildlife Management 69:124-132.

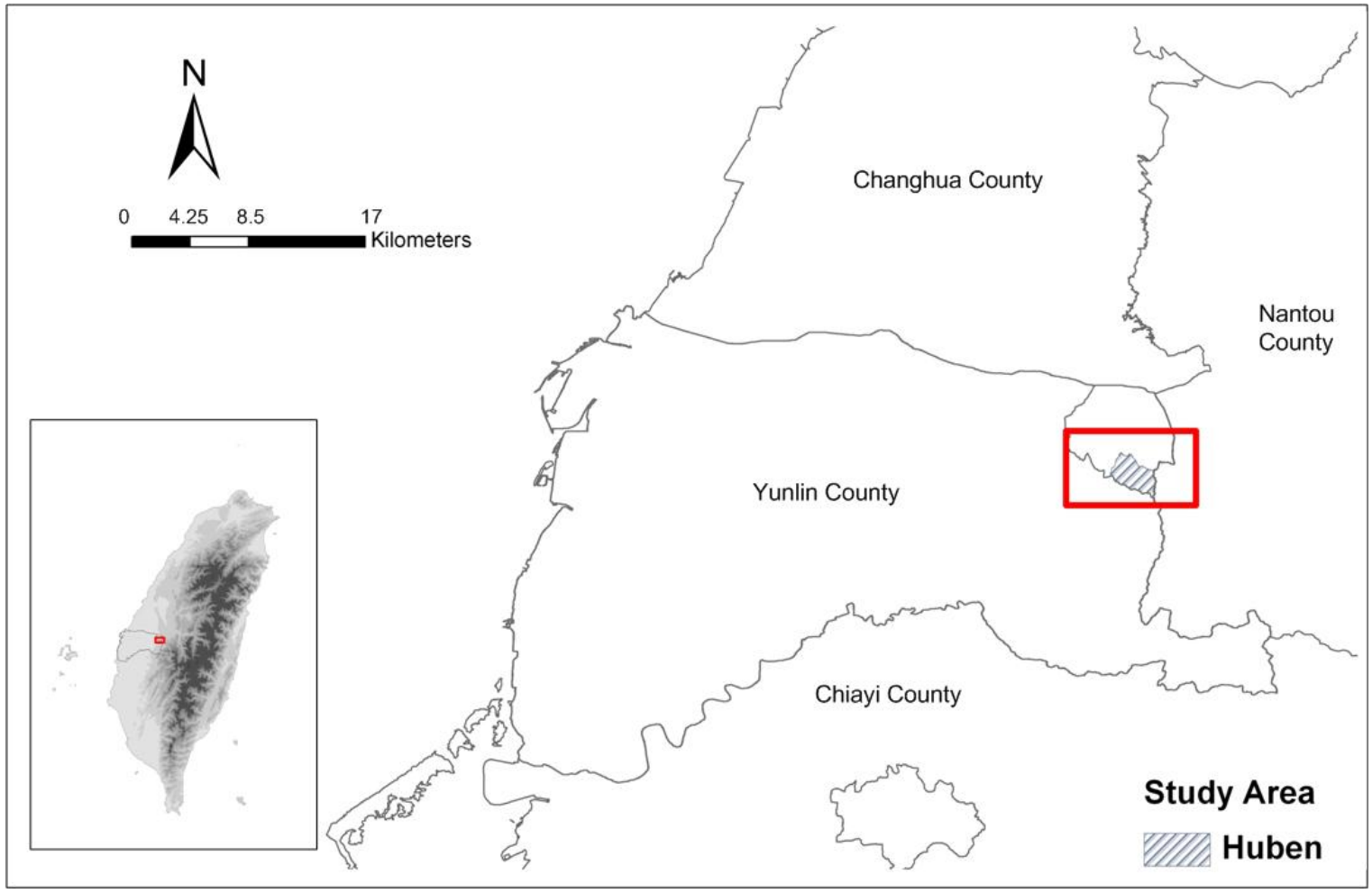


圖 1. 2006 年八色鳥繁殖與天敵研究樣區位置，雲林縣林內鄉湖本村 (120˚37.1’E, 23˚44.5’N)。

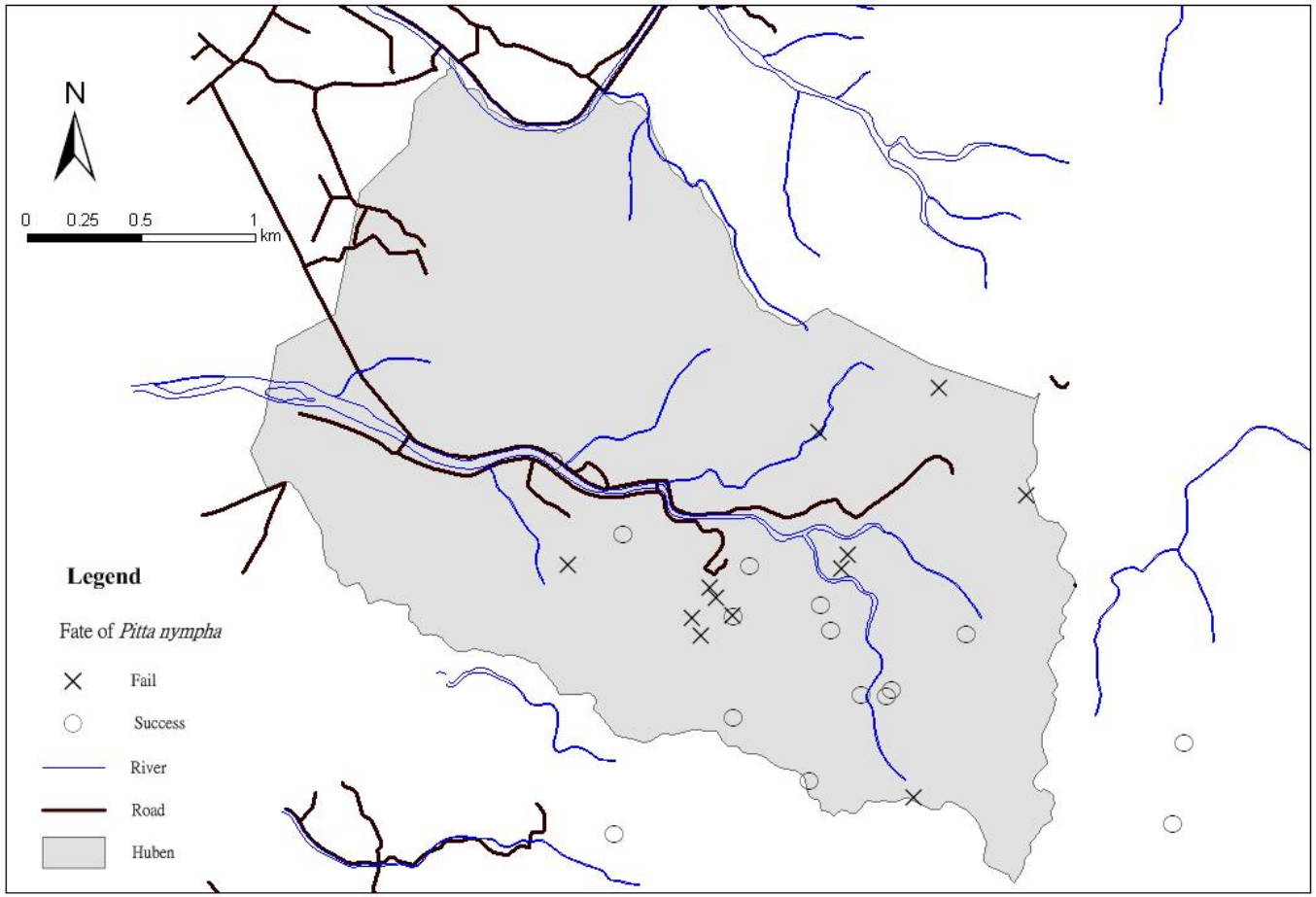


圖 2. 2006 年湖本村境內八色鳥鳥巢分布位置，○繁殖成功有幼鳥離巢的巢位，X繁殖失敗的八色鳥巢位。

圖 3. (A) 紅斑蛇掠食八色鳥幼鳥，(B) 被赤背松柏根掠食後遺留的八色鳥蛋殼，(C) 南蛇掠食八色鳥巢中的蛋，2006 年於雲林縣林內鄉湖本村。

Appendix 附錄

雲林縣林內鄉湖本村簡介

雲林縣野鳥學會

舊　稱：湖山寮湖底寮。清末時，最早來到湖本村的居民為張姓四大柱，居民大多以務農維生，但因交通不便,與外界缺乏聯繫，直至日據時代為控制水源及進行戰備工事而建立戰備道路，至此與外界開始有了較多往來。光復後，正式更名為湖本村，隸屬於雲林縣林內鄉。

地理位置：湖本村位於雲林縣林內鄉的東南隅，斗六市郊的石榴班及楓樹湖里相接臨，.除村落集中地為平原地形外，大部分為高約 100~300 公尺的丘陵地形。而這些丘陵地大多開發為果園，但保有相當部份的原始林，其中枕頭山便在此，枕頭山林相優美為八色鳥及其他鳥類之重要棲地。

名產特色：由於本村地形多為丘陵地，因此居民多以種植果樹為主，其中柳丁、柑橘、鳳梨為大宗，此外竹筍亦有不少的數量。

人　　口：目前約有九百一十六人

湖 山 水 庫 簡 介

雲林縣野鳥學會

湖山水庫為一離槽式水庫，攔河堰設於南投縣竹山鎮桶頭，攔截清水溪之水，再以 6.9 公里長的引水路將水注入水庫；水庫壩址位於雲林縣斗六台地的幽情谷、崙背坑一帶，大約位於斗六市東南方約 10 公里處【斗六市梅林里羨仔坑之幽情谷】，工程用地面積約 422 公頃，其中 228 公林務局阿里山事業區第 71-73 林班，屬於水源涵養之保安林。

湖本村搶救八色鳥大事紀

雲林縣野鳥學會

民國 88 年 2 月

為因應中二高及東西向快速道路的土方要求，雲林縣政府開始開放陸砂開採。

並於民國 88 年 2 月核准通過砂石業在湖本村枕頭山開採陸砂。

88 年 3 月

成立「湖本村反陸砂自救會」。對湖本居民來說，陸沙開採後他們即將面臨的是：自然生態環境遭受到破壞、砂石車的紛擾,等問題，在陸砂開採第一次調查中，由民調中得知居民對陸砂開此案持強烈反對態度，為了不讓湖本村變成「砂石村」，在社區領導組織和居民積極運作之下，喊出「湖本生態村」的願景與之抗衡，目的就是為了讓湖本村保有自然景觀、動植物生態可自由棲息,不遭受破壞。因此，反對陸砂開採的行動進而凝聚了湖本村居民的共識，對保護家園的意識也由此發出。

民國 88 年 8 月

湖本村村民到雲林縣縣政府廣場前抗議陸砂開採

民國 88 年 10 月

「雲林縣鳥會成立」。再次與居民的對話中，得知湖本村早期有不少的俗名「撿蓋仔」的珍貴稀有保育動物「八色鳥」，並從以前的獵人口中得知在日治時期，日本人常常委託他們捕捉八色鳥運回日本當標本。有鑑於此再加上湖本村面臨陸砂開採的問題，因此這些來自婆羅洲的夏候鳥----八色鳥的發現，讓愛鳥人士發出呼籲，希望社會能重視這些珍貴稀有的鳥類，重視台灣生態環境保育的問題，也使原本純粹反對陸砂開發案，也藉此轉移到湖本村自然資源豐富性必須保護的訴求，將搶救八色鳥作為湖本村反陸砂開採的主要訴求。

民國 88 年 11 月

雲林野鳥學會舉辦賞鳥活動為調查八色鳥工作暖身

民國 88 年 12 月

發起網路「搶救八色鳥的故鄉---湖本村」連署活動

民國 89 年 2 月

「搶救八色鳥的故鄉---湖本村」

中華鳥會發起全球鳥會與保護團體連署「搶救八色鳥的故鄉---湖本村」

民國 89 年 3 月

由南投特生中心進駐湖本村完成準備進行調查八色鳥工作

民國 89 年 4 月 22 日

於湖本村發現八色鳥蹤跡

民國 89 年月

「搶救八色鳥的故鄉---湖本村」

來自全球 21 個國家、73 個保育組織共同參與「搶救八色鳥的故鄉---湖本村」連署活動

民國 89 年 06 月 14 日

陳水扁總統為八色鳥請命

陳水扁總統為八色鳥請命，並呼籲全民一起來搶救八色鳥，總統表示一個兼顧自然保育與產業發展的台灣，才是真正的福爾摩莎美麗之島，一個能讓自然萬物與人類和諧共存的空間，才能生生不息永續發展，台灣若是失去八色鳥，不僅將失去最美的顏色，也將造成全球的損失。

民國 89 年 08 月

八色鳥國際化

湖本村村長尹伶瑛受國際鳥盟邀請參加國際鳥展，在會中就搶救八色鳥進行專題演講，湖本村於是成為國際間注目焦點。

民國 90 年~94 年１2 月

湖本村居民持續抗爭陸砂開採

民國 94 年 12 月 23 日

經濟部礦物局正式公告湖本村為土石禁採區

八 色 鳥 簡 介

雲林縣野鳥學會

學　名：Pitta brachyuran

英文名：Fairy Pitta 或 Blue-Winged Pitta

別　名：據【湖本村史】介紹，八色鳥又稱八色鶇、藍色八色鶇，屬燕雀目八色鳥科，為稀有的夏候鳥。在湖本村村民則叫八色鳥為「撿篕仔」（ㄎㄧㄡ---ㄏㄚˊ---阿）。

特　徵：額到後頭栗褐色，眉線金黃色，過眼線黑色甚寬且長，背部翠綠色且光澤，喉乳白色，胸腹黃色，腹中央到尾下覆羽為鮮紅色，尾上覆羽為藍色，嘴黑色，腳淡褐色。

聲音：ㄎㄧㄡ---ㄏㄚˊ---阿。八色鳥常在濃密的闊葉林、竹林的底層翻動竹葉或數葉，以尋找蚯蚓、蝸牛等為食，而湖本村的人們誤以為八色鳥在檢落葉，其聲音就像「ㄎㄧㄡ---ㄏㄚˊ---阿」，因此，湖本村村民就稱八色鳥為「撿篕仔」。

八色鳥全世界共 25 種台灣一種為。名列亞洲及台灣鳥類紅皮書之瀕臨絕種之生物，並依野生動物保育法已被列為珍貴稀有之【第二級】保育鳥類

分布狀況

八色鳥為同屬鳥中向北遷移最遠的一種，全球繁殖地非常侷限地分布在日本、韓國、中國大陸東南方及台灣的少數地點，度冬地以現有資料推斷是以婆羅洲（Borneo）為主。

日本：主要發現於南方的本州（Honshu）、四國（Shikoku）及九州（Kyushu）的日本海與太平洋海岸地區

南、北韓：八色鳥則屬於稀有過境鳥，但南韓南方數個島嶼有繁殖紀錄，南、北韓大陸上可能也有零星的繁殖地分布

中國大陸：東方及南方的各個省份都有八色鳥零星紀錄，其中數個省份有確定的繁殖地點

香港、越南：八色鳥均屬過境鳥種，但紀錄均不多

婆羅洲、東馬來西亞的沙巴及砂勞越、汶萊、印尼的加里曼丹等地：雖為其主要度冬地，但實際紀錄也不多，紀錄都出現在繁殖季（10 - 12 月）

台灣：整體而言中南部丘陵地帶分布較多，八色鳥的紀錄仍以西部低海拔地區為主，東部紀錄甚少。

族群量

目前尚未有研究嘗試估計八色鳥全球數量。在其廣大的生殖範圍內已有少數地點被證實密度相當高，如在日本四國的 Mi-ike 估計 1.5 km^2 內有 14 隻，在 Aya-cho 0.5 km^2 則有 3 隻（Kanai 1992）。而在台灣，湖本村適合的棲地內，一平方公里範圍內曾記錄達 15 隻以上（林瑞興 未發表）。國際鳥盟就現有資料推估其數量應不超過數千隻或一萬多隻（BirdLife International 2001），更有學者推估其族群量可能僅在數百至少數幾千隻之間（Lambert and Woodcock 1996）。

棲　地

八色鳥為一森林性鳥種，大部分時間在地面活動，但鳴叫時喜歡在高處，如在高樹或稜線上樹木的粗枝上（BirdLife International 2001）。八色鳥繁殖地分布在面積不大的亞熱帶森林，顯示其可能有特殊環境需求（BirdLife International 2001）。在台灣由於低海拔原始林大都已遭伐除或改變林相，八色鳥出現的環境也就以竹林闊葉林混生林、闊葉林造林地、相思樹為主的闊葉樹混生林及闊葉樹次生林等散布在台灣低海拔山坡地的樹林為主。

八色鳥警覺性高，喜築巢於林區接近地面之樹洞或斜坡之岩洞裡，巢口會以枯葉偽裝隱密良好。

食　性

八色鳥為蟲食性，包括甲蟲、螞蟻、蚯蚓、百足類、蝸牛、鞭蠍、鱗翅目幼蟲及蟬等（Lambert and Woodcock 1996）。育雛則以蚯蚓為主（Severingahaus *et al.* 1991, 林瑞興 未發表）。雛鳥在離巢前 4 - 5 天每天可消耗 70 - 80 隻蚯蚓（Okada 1999 in BirdLife International 2001）。

生　殖

日本：八色鳥於五月中旬至下旬抵達，五月下旬至六月初可聽見其叫聲，鳥巢通常築在闊葉林內斜坡上（40 - 50°），離地 2 - 5 m，窩卵數 4 - 6 顆，在生殖期間親鳥通常離巢在約 100 - 400 m 以內（BirdLife International 2001）。日本繁殖季可到 7 月底（Fujita *et al.* 1992b）。

南韓：Cheju island 5 - 6 月是八色鳥產卵與育雛的時節（BirdLife International 2001）。

台灣：已於桃園石門水庫、台中大坑、霧峰、台中豐原、雲林林內、台南東山、高雄美濃等地發現八色鳥繁殖（Severinghaus *et al.* 1991, 劉孝伸 1993，張進隆 1995, 張永福 1999, 林瑞興 未發表）

1987 年 7 月於台中大坑相思樹林內發現的八色鳥巢高約 3m（Severinghaus *et al.* 1991）

1993 年於高雄美濃發現的巢高則為 2.7 m（劉孝伸 1993）

2000 年 6 月首次於雲林林內發現 1 個巢

2001 年則已紀錄 13 個鳥巢，在林內所發現的鳥巢多數位於斜坡地上或近垂直的峭壁上，僅 2 巢位於斷樹樁或樹幹凹槽上，窩卵數以 5 顆為主，也有 3 顆者（林瑞興 未發表）。

社團法人中華民國野鳥學會
WILD BIRD FEDERATION TAIWAN

11683 台北市景隆街 36 巷 3 號 1 樓
1F, NO.3, LANE 36, JINGLONG ST., 11683, TAIPEI, TAIWAN, R.O.C.
TEL：886-2-86631252　FAX：886-2-29303595
E-mail：wbft@bird.org.tw　WWW：www.bird.org.tw