

附錄目

| | |
|--|----|
| 附錄一 關原地區巢箱使用記錄表..... | 76 |
| 附錄二 性別鑑定..... | 77 |
| 附錄三 親緣關係鑑定..... | 77 |
| 附錄四 關原地區青背山雀錄影帶觀察記錄表..... | 78 |
| 附錄五 關原地區青背山雀錄影帶記錄雛鳥位置追蹤表..... | 79 |
| 附錄六 山雀科鳥類偶外交配和巢中偶外交配子代比例之相關文獻整理..... | 80 |
| 附錄七 關原地區巢#81 _(o) 煤山雀親鳥餵食情形..... | 81 |

附錄一 關原地區巢箱使用記錄表

巢箱使用情況記錄表

日期：_____ 紀錄者：_____ 天氣：_____

| 時間 | 巢箱號碼 | 使用狀況 | 照片號碼 |
|----|--------|------|------|
| | Old 1 | | |
| | New 1 | | |
| | Old 2 | | |
| | New 2 | | |
| | Old 3 | | |
| | New 3 | | |
| | Old 4 | | |
| | New 4 | | |
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| | New 5 | | |
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| | New 6 | | |
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| | Old 10 | | |
| | New 10 | | |
| | Old 11 | | |
| | New 11 | | |
| | Old 12 | | |
| | New 12 | | |
| | Old 13 | | |
| | New 13 | | |
| | Old 14 | | |
| | New 14 | | |
| | Old 15 | | |
| | New 15 | | |

附錄二 性別鑑定

青背山雀雌雄在外觀相似，雖成鳥可藉由孵卵斑之有無，以及是否有孵雛之行為來判斷性別，但雛鳥性別則無法直接以外表判斷，因此需藉由 DNA 作性別之鑑定。由於雄雌鳥具有不同的性染色體，雄鳥為 ZZ，雌鳥為 ZW；CHD1 為性染色體上的一段基因，雄鳥之性染色體為 CHD1-Z，雌鳥則為 CHD1-Z 和 CHD1-W，藉由聚合酶連鎖反應（Polymerase chain reaction, PCR）將 DNA 增殖後，進行膠體電泳，藉由電泳所得之片段來判斷其性別，於電泳膠上雄鳥呈現 1 條片段，雌鳥則為 2 條片段，於本研究中使用之引子（primer）為 2550F 和 2718R（Fridolfsson & Ellegren 1999）。

附錄三 親緣關係鑑定

許多鳥類為社會性一夫一妻（social monogamous），有偶外交配之行為，藉由比對親鳥與雛鳥之多變異的微衛星體基因座可得知巢中雛鳥是否有偶外交配子代（Wang et al. 2005; 王玫婷 2005）。雛鳥於微衛星體基因座上的兩個對偶基因分別來自雄鳥和雌鳥，因此若雛鳥的對偶基因其中之一和雌鳥的對偶基因相同，但另一個對偶基因和雄鳥不同，則判斷該雛鳥為偶外交配子代。藉由聚合酶連鎖反應增殖微衛星體基因座，進行膠體電泳後，再使用軟體 GENETIC PROFILER 2.0（Amersham Biosciences）判讀對偶基因上的值，進行比對。於本研究中用了 5-9 個微衛星體基因座來進行檢測，利用軟體 CERVUS 2.0（Marshall et al. 1998）計算於本研究中能檢測出巢中偶外交配子代子代之機率在 95% 以上。

附錄五 關原地區青背山雀錄影帶記錄雛鳥位置追蹤表

光碟名稱：

色環 a=



































































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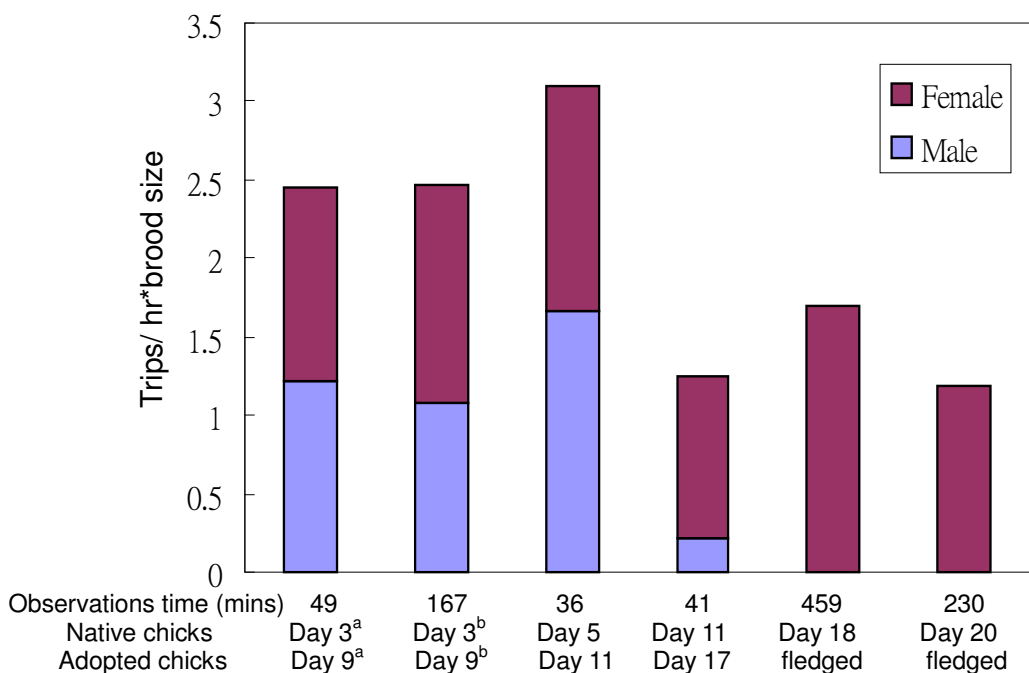
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附錄六 山雀科鳥類偶外交配和巢中偶外交配子代比例之相關文獻整理

| Species | | | % of brood with | % of | |
|---|--|------------|------------------------|----------------------|-----------------------------|
| Popular name | Study area | Study year | EPO(mean) | EPO(mean) | Reference |
| Blue tit (<i>Parus caeruleus</i>) | Belgium | 1990 | 31 | 11 | Kempnaers et al. 1992 |
| | Norway | 1992-1995 | 36 | 7 | Krokene et al. 1998 |
| | France | 2000-2002 | 53.6 | 16.1 | Charmantier & Blondel 2003; |
| | Corsica, Pirio | 2000-2001 | 68 | 25.4 | Charmantier et al. 2004 |
| | Corsica, Muro | 2001 | 50 | 18.2 | |
| Great tit (<i>Parus major</i>) | Germany | 1993-1997 | 27.8-44.2 | 5.4-8.6 | Lubjuhn et al. 1999 |
| | Norway | 1992-1995 | 27 | 8 | Krokene et al. 1998 |
| Coal tit (<i>Parus ater</i>) | Germany | 2000-2001 | 67-83.6 | 27-43.9 | Dietrich 2004 |
| | Germany | 1999 | 75 | 25.3 | Lubjuhn et al. 1999 |
| Green-backed tit (<i>Parus monticolus</i>) | Taiwan, Ao-Wan-Da National Fprest Recreation Area | 2002-2004 | 0-25 (18) | 0-12.5 (7.5) | 王玫婷 2005 |
| | Taiwan, Kuanyuan | 2004-2005 | 18.18-42.56 (27.79) | 7.14-10.71 (8.33) | 本研究 |

附錄七 關原地區巢#81_(o)煤山雀親鳥餵食情形

2005 年於樣區中，觀察記錄到 2 巢（巢#65_(o)、81_(o)）分別為兩對煤山雀配偶使用巢箱繁殖的巢，兩巢的雛數分別為 6 隻和 4 隻，然巢#65_(o)於雛鳥孵出第 8 天時，3 隻雛鳥被捕食者所捕食，捕食者並將剩下 3 隻雛鳥連同巢材拖至洞口，然因為洞口過小，所以無法順利將剩餘雛鳥拖出，而使雛鳥得以存活，然巢#65_(o)親鳥之後卻不再回巢餵食，因此將巢中剩下 3 隻雛鳥（adopted chicks：Day 9）寄養至巢#81_(o)（native chicks：Day 3），記錄兩性親鳥於寄養前、寄養後以及寄養雛鳥離巢後餵食情形，由於並非刻意觀察，所以資料分析只去分析於觀察時段超過 30 分鐘以上之資料。寄養的雛鳥較原巢中雛鳥早離巢 5 天，且所有雛鳥皆成功離巢。於操作前後皆有記錄到兩性親鳥進巢餵食，但當寄養的雛鳥離巢後，則未再觀察到雄鳥進巢餵食，雌鳥負責巢中剩下的雛鳥之餵食，至全部雛鳥離巢。



a 表操作前，巢#81_(o)親鳥之餵食頻率；b 表操作後，巢#81_(o)親鳥之餵食頻率