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南、北大武山地區赫氏角鷹族群監測與獵捕壓力

**Population, Ecology, and Hunting Pressure of Mountain Hawk-eagle in
the South and North Tawu Mountains**

期末報告



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中文摘要

本研究由 2004 年 2 月至 2007 年 9 月在南、北大武山西側屏東縣霧台、泰武、來義、春日和獅子等 5 個原鄉，調查熊鷹(*Spizaetus nipalensis*)的分布、活動範圍、獵捕壓力、羽毛的買賣行為和頭目使用態度，另在東側台東縣達仁、金峰、延平和卑南鄉調查活動範圍和模式、棲地利用、繁殖行為和獵捕壓力，希望這些資訊有助於此瀕臨絕種猛禽的保育和原住民傳統文化的延續。

由過去 13 年間訪查和現地調查紀錄顯示，屏東縣 5 個鄉均有熊鷹分布，海拔分布介於 798~2,865 m。其間繫放 6 隻雄鳥(2 成、4 亞成)和 4 隻雌鳥(1 成、3 亞成)。雌鳥各型質均大於雄鳥($P = 0.039\sim 0.001$)，其中以體重比(1.36)差距最大，其他介於 1.06~1.11。2~3 月繫放熊鷹($n=2$)無換羽現象，亞成鳥在 4~5 月就開始換羽($n=3$)，8、10 月份亞成鳥($n=2$)仍有換羽現象，成鳥($n=3$)換羽較晚(8~12 月)。

利嘉、延平林道兩隻雄成鳥活動範圍各為 5.4 km²、5.6 km²，亞成鳥中有兩隻活動範圍較大，可達 607.7、275.4 km²，前者和另一隻的活動範圍會跨越中央山脈兩側，另外兩隻活動範圍較小，各為 17.1、5.1 km²。利嘉林道一隻雄成鳥每日移動距離至少在 1.15~8.2 km，平均 4.58 km，延平林道一隻雄成鳥單日飛行距離至少 2.9~5.6 km，平均 5.11 km。熊鷹中午前 1~3 小時的飛行活動通常最為頻繁，若天氣穩定，則午後 1~2 小時和入夜前 1 小時也是如此，雨勢較大時則停止活動。

熊鷹日間活動傾向選擇天然林，但也出現在人工林，夜棲點則選在天然林。巢位($n=17$)周邊地區半徑 1.5 km 內的棲地組成有 22.0%~99.9%為天然林，平均為 88.6%。

熊鷹一般在 12 月築巢，巢構築在阿里山千金榆(*Carpinus kawakamii*)、灰背櫟(*Cyclobalanopsis hypophaea*)和崖薑蕨(*Pseudodrynaria coronans*)。訪查得知，多數在 1 月生蛋(1 枚)，3 月孵化，5~6 月離巢。3 月 27 日~6 月 4 日在大竹溪觀察的 1 個巢總計 68 天共記錄 54 筆確定種類的餵食行為，組成以大赤鼯鼠(*Petaurista petaurista grandis*)最多，其次依序是白面鼯鼠(*Petaurista alborufus lena*)、赤腹松鼠(*Callosciurus erythraeus*)、台灣獼猴(*Macaca cyclops*)和藍腹鵲(*Lophera*

swinhoii)，占 6~14%，其它種類如鼬獾、長吻松鼠 (*Dremomys pernyi owstoni*)、黃鼠狼 (*Mustela sibirica taivana*)、台灣長鬃山羊 (*Naemorhedus swinhoei*)、標蛇 (*Achalinus niger*)、綠鳩 (*Ducula aenea*)、台灣藍鵲雛鳥占的比例較少，不到 2%。以分類群來分，依次是哺乳類(88.9%)、鳥類(9.3%)、爬蟲類(1.8%)。可確定性別的情形下，雌雄鳥各自帶回 25 次食物，但雌鳥帶回的食物部份應該來雄鳥。餵食全由母鳥負責，每日餵食 1~4 次，每次持續 1~64 分鐘，一天平均花上 28.4 ± 19.5 分鐘(49 天)，以 7 時帶回最多。雛鷹在第 52 天(5 月 2 日)開始自己進食，每日 1~5 次。5 月 24 日雛鳥(75 日齡)首次踏出窩巢至巢邊枝幹活動。訪查到的大竹溪和金崙溪熊鷹巢間距介於 1.15~3.75 km，平均 2.17 ± 1.32 km (n=12)，繁殖密度為 1 對/9.4 km²。

查訪 145 位在世獵人和 5 位已過世者的家屬，得知一位已過世獵人 18 年間曾獵捕 220 多隻熊鷹，平均一年約 12 隻左右。台東縣達仁、金峰鄉和屏東縣來義、春日鄉獵捕壓力最大，1960 年代的年獵捕量預估小於 5 隻，1970 年代開始攀升(12.9 隻)，1980 年代增幅趨緩(13.6 隻)，1990 年代又大幅上揚(17.5 隻)，並於 2000 年代前半期(2000~2005 年)達到高峰(40.2 隻)，其中達仁、金峰鄉的獵捕量在 1990 年代起開始超越和可能排擠到來義、春日鄉的獵捕量。整體而言，2005 年起的獵捕量似有下滑情形，可能和先前的獵捕量過多有關。

亞成鳥具三角黑斑的初級飛羽，特別是長度最長毛的第六根(P6)單價最高，又三角斑數量越多售價也越高(一對 3 萬多元)。羽毛商表示近 13 年的買氣轉弱，但此與獵捕量的遞增現象矛盾，極可能是個體戶賣者和獵人直銷模式的加入而瓜分市場。

受訪頭目家中多半擁有不到 6 組羽毛，主要由商店購買，多數認為日後仍有需求，以兒孫的婚禮需求為主。受訪大多贊成重建傳統頭戴羽毛方式，主要是企盼文化延續，多數認為頭戴方式應由頭目家族會議決定。仿製羽毛沒有代表性，故接受度不高。若政府免費提供真羽毛，多數受訪者就不再購買，但多半要求政府應該允許他們在婚禮或鷹羽損毀時就能提出申請。

英文摘要

This study investigated the distribution, population, habitat use, home range, activity pattern, breeding habit, and seasonal movement of the endangered Mountain hawk eagle (*Spizaetus nipalensis*) at Wutai, Taiwu, Laiyi, Chunrih, and Shihzih Townships by the western side of Taiwu Mountains during April 2004-September 2007. And issues on human dimension such as the hunting pressure, feather-trading, and attitude toward status and conservation of this species were collected as well. Hopefully such information could benefit our conserving of this endangered species and the traditional culture of indigenous people.

Based on sighting records for this year and the past 13 years, results showed that hawk eagles distributed at all townships, at elevation of 798 m to 2865 m. We captured and radio-tracked six males (two adults and four juveniles) and four females (one adults and three juveniles). Female is larger in size, and among all measurements the sexual ratio of body mass was highest (1:1.36), compared with others (1.06-1.11). Molting was not found in February and March (n=2), starting from April-May (n=3), continuing between August-October for juvenile (n=3), and maybe into December for adult (n=2)

Home range sizes of two adult male birds were 5.4 and 5.6 km², and that of two juveniles with larger home range were 607.7 and 275.4 km² and two with smaller home range were 17.1 and 5.1 km² and. Home range of two juveniles covered both sided of the Central Mountain Range. One male adult hawk eagle traveled at 1.15-8.2 km a day, another male adult one at 2.9-5.6 km. Activity peaked 1-3 hours before noon and 1-2 hours after noon, and sometimes at dusk. Radio locations were mostly at natural forest, while some at forest plantation. But hawk eagle exclusively roosted at natural forest. Habitat composition within 1.5-km radius of 17 nests consisted of 22-99.9% of natural forest, with a mean of 88.6%.

Based on local hunter' experience, it was known that mountain hawk eagles nested in December, laid egg in January with egg hatching in March and with young fledgling in May-June. Nests were found on grey-dorsal oaks (*Cyclobalanopsis hypophaea*) and *Carpinus kawakamii* at steeply tiny valleys. Prey brought to the nest made up of 88.9%

of mammals, 9.3% of birds, and 1.8% of reptiles by number. Surprisingly, nocturnal Formosan giant flying squirrel (*Petaurista petaurista*) was the most common prey (), followed by Red-bellied tree squirrel *Callosciurus erythraeus*), Formosan giant flying squirrel (*P. alborufus lena*), and Swinhoe's pheasant (*Lophera swinhoii*), Formosan rock-monkey (*Macaca cyclopis*) (6-14%). Other less common preys included Formosan ferret-badger (*Melogale moschata subaurantiaca*), Formosan weasel (*Mustela sibirica taivana*), young Formosan serow (*Naemorhedus swinhoii*), Formosan blue magpie (*Urocissa caerulea*), and snakes. Number of feeding trips ranged less than four times a day, with a bout of less than 64 minutes per day totally. Feeding was made by the female. Prey was taken to the nests mostly at 7 a.m. The breeding density at Taizu and Kinlun Stream was 9.4 km² per pair.

We interviewed 150 hunters in total. Of them, five was deceased, of which one captured about 220 eagles, averaging 12 birds a year. Hunting pressure was most heavy at Laiyi and Chunrih Townships of Pingtung County, and Daren and Jinfong Townships of Taitung County. In the 1950s-1960s, the estimated amount of eagles captured was <5 birds per year, increasing in the 1970s (12.9 birds/year), slightly rising in the 1980s (13.6), markedly increasing in the 1990s (17.5), soaring in the early 2000s (40.2). However, that of 2006-2007 appeared to decrease. Hunting pressure was highest at Laiyi and Chunrih Township before 2000 and was replaced by the Daren and Jinfong Township.

Only juvenile feathers have triangular dark patches and the longest sixth primary feather was most valuable, costing over \$ 30000 NTD for one pair. Survey on feather market and local leader's attitude toward usage was interviewed at the same time. Additionally, research on ecological habits was examined continuously. For the past decade, owners of three craft stores who claimed that the feather business went down, contradictory to the higher capture. This may represent that hunters sell to individuals more often than before.

Interviewed leaders owned less than six sets of feathers mostly. They acquired them from the craft stores mainly, and most will continue to do that in the future for the sake of children wedding rituals. Most leaders said they coincided with restoring traditional way of wearing eagle feathers on the headpiece on behalf of culture preservation; however we were not quite sure which period of tradition they meant due to it varies with

year. This question needs further examination. Most said it was the leader family meeting that should decide the rule of wearing in future. The fake feather was not accepted by most interviewees because it is not representative. We think this question may underestimate its acceptance because feather sample was not available here. If the authorities were willing to provide them real feather, most said they would not purchase any longer, and weeding or wearing feather were the two most demanded elements for application.