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Important areas and habitat preferences of the Palawan Peacock Pheasant *Polyplectron emphanum*

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INTRODUCTION

The Palawan Peacock Pheasant *Polyplectron emphanum* is a 'Vulnerable' (Collar *et al* 1994) species endemic to the Philippines' island of Palawan where its traditionally documented habitat of the primary forests of the coastal plains (King 1981) is rapidly disappearing (e.g. Quinnell & Balmford 1988). Consequently, *P. emphanum* is becoming increasingly restricted to higher altitudes (McGowan *et al*. 1989). *Polyplectron emphanum* is threatened by continuing and accelerating forest alteration, and hunting, egg collecting (subsistence) and trapping for the pet trade (McGowan & Garson 1995), with the estimated global population of <10,0000 thought to be in rapid decline (Collar *et al.* 1994).

The main aims of the project were to document important sites and habitats and obtain population density data for all the threatened and endemic bird species of Palawan. Specifically, the project aimed to investigate the influence habitat has on the dispersal of display scrapes of male *P. emphanum* and study the calling behaviour of male pheasants.

STUDY SITES

Surveys were conducted at five study sites in forests over three different soil types (Table 1) between October 1999 and February 2000 by David Lee (DL) and Mark Whiffin (MW). Surveying was conducted to achieve reasonable evenness in survey effort across soil type.

Table 1: Description of the five study sites surveyed. (SPSRNP = St. Paul's Subterranean River National Park).

Study site	Fix[1]	Soil type	Altitude	Human disturbance
SPSRNP	N 10°11.978' E 118°54.731'	Limestone	10-240m	None
Panaguman, Marofinas	N 10°13.376' E 118°57.140'	Shale and sandstone	100-340m	Hunting - attendant trails and shelters
Port Barton	N 10°24.654' E 118°11.220'	Shale and sandstone	70-300m	Some areas selectively logged up to 1989; pig trapping in adjacent forest
Trident, Narra	N 09°19.430' E 118°21.757'	Ultrabasic	180-650m	Collection of almaciga resin (*Agathis dammara*) - attendant trails; possibly hunting
Dumanguena, Aborlan	N 09°26.811' E 118°25.264'	Ultrabasic	200-580m	Localised small-scale logging; *P. emphanum* trapping[2]

[1] - Fix taken from study site base camp, except for Panaguman site where fix is from start of transect

[2] - Since the 1960s (Caleda 1986)

METHODS

Two methods, conducted concurrently within the same survey period, were used to survey *P. emphanum*: a point count sampling method (Buckland *et al*. 1993; Jones *et al*. 1995) and a variable-width line transect method (Buckland *et al*. 1993). Count stations were positioned 200m apart along straight line transects, surveyed from 06h30-12h00 and repeated once the following day. At each station an initial count period of 10

minutes was used to record all bird species. A further 10 minutes period was sampled exclusively for *P. emphanum* to increase expected low encounter rates of the species (e.g. McGowan *et al*. 1989). After each 20 minute count period, the 200 m to the next station was walked at 1km/h with the observer collecting perpendicular distance data on any flushed individuals or calling males. The survey methods followed the normal assumptions of Distance sampling (Buckland *et al*. 1993).

The location of display scrape aggregates were determined from the position of calling males recorded along survey transects. DL and MW swept the area to try and locate all maintained scrapes and boundaries of the calling site. Caleda *et al.* (1987) record that male *P. emphanum* maintain an aggregate of 1-16 scrapes, although there is inherent difficulty in deciding upon what comprises a 'single aggregate'. An arbitrary limit of 50 m between nearest adjacent scrapes was used to separate areas assumed to be utilised for displaying by different males.

Habitat structure was assessed within a 20 m radius plot surrounding each of the census stations and scrape clusters located. The selection of habitat variables for measuring, counting or estimating at each plot largely follow McGowan *et al.* (1989) and McGowan (1994), who in turn considered the approach of Dueser and Shugart (1978), although only regarded more general habitat structure parameters.

At Narra we collected male pheasant calling data over two survey periods of seven days, in November 1999 and February 2000. Calls were recorded from a vantage point between 06h30-18h00 on consecutive days. Calling data collected included call bout start and finish times, number of calls during a bout, and direction and distance of the calling male from the vantage point. This established the position of calling centres, identification of individual males, and calling frequency and its variability.

RESULTS

Encounter rates

A total of 438 point counts and 78.4 km of transects were surveyed over the five study sites and yielded 22 and 14 *P. emphanum* encounters respectively (Table 2). The majority of *P. emphanum* encounters were of calling males (n = 31) while sightings were very infrequent (see also McGowan *et al*. 1989) and all of females (n = 5). Any inferences on site encounter rates must consider survey period (St Paul's in December 1999, Panaguman and Port Barton in January 2000, Trident and Dumanguena in February 2000) and the associated sporadic nature of male calling behaviour (McGowan *et al* 1989).

Polyplectron emphanum was encountered within all altitudinal bands of 100 m at each of the five study sites, and ranged from sea level (SPSRNP) to 620 m (Trident), the maximum altitude surveyed. No encounters were made in the limestone karst or coastal forests of SPSRNP, on ridge tops, or within 50 m of running water or 100 m of the edge of forest blocks.

Table 2: Survey effort and encounter rates of *P. emphanum* stratified by method and soil type. (SPSRNP = St. Paul's Subterranean River National Park).

Soil type	Point counts				Line transects			
	Survey effort (no.)	Person hours	Contacts	Encounter rate (per hour)	Survey effort (km)	Person hours	Contacts	Encounter rate (per hour)
Limestone (SPSRNP)	132	44.0	3	0.02	23.6	23.6	8	0.34
Shale/sandstone (Port Barton, Panaguman)	166	55.3	12	0.22	30.0	30.0	3	0.10
Ultrabasic (Trident, Dumanguena)	140	46.7	7	0.15	24.8	24.8	3	0.12
Total	438	146	22	0.15	78.4	78.4	14	0.18

Habitat Associations

Initial analyses, by Mann Whitney U test, of the habitat data collected suggest differences between display scrape microhabitat plots and count stations which are assumed not to be scrape sites. Display scrape plots had significantly higher numbers of large trees of girth at breast height (gbh) > 320 cm (p <0.001), 320 cm > gbh > 160 cm (p = 0.003), 160 cm > gbh > 80 cm (p < 0.001), and smaller trees of size gbh < 10 cm (p = 0.005), fewer numbers of herbaceous plants (p = 0.003), greater numbers of palms (p < 0.001), fewer tree falls (p = 0.040), a significant absence of water (p = 0.002). Of those variables estimated, there appears to be significantly more foliage at the mid-canopy level at display scrapes (p < 0.001), and more low level foliage (p < 0.001) and ground level foliage (p < 0.001) at point count plots. Principal component analysis will be used to remove correlation between variables and reduce the number of habitat measurements in the final analysis.

Calling behaviour

Call counting during November and February yielded 41 and 22 calling bouts respectively, although these data are currently being adjusted according to actual focal study period, since February's data were largely affected by adverse weather conditions. Despite difficulties in establishing the exact location of calling males, due to terrain, vegetation cover, wind and rain, and background noise, the position of the six calling males recorded within the study area of approximately 50 ha (0.5 km^2) differed little between study periods. The identification of a seventh male may have occurred in February, but because of weather conditions it is possible that one male was recorded in two adjacent localities.

DISCUSSION

Our encounter rates were higher overall than those recorded by McGowan *et al*. (1989),

but confirm their statement that, although *P. emphanum* may not be especially common, it is probably not particularly rare in suitable habitat. These differences in encounter rates may be attributed to variability between the sites and methods employed by the two studies, making direct comparison inappropriate. McGowan *et al*. (1989) used a point count method with an extended count period of 30 minutes at stations 100m apart during July- September at a site in central Palawan not visited during our study. Since the breeding season is assumed to be February-April (McGowan *et al*. 1989) then the higher encounter rates of calling males during our study are not unsurprising.

The variables that differ significantly between scraped areas and non-scraped areas infer scrape site locality may be associated with the degree of local forest disturbance. Small patches of altered microhabitat, created by tree falls, foster the development of different vegetation to that of the surrounding forest (Brokaw 1985) with understorey foliage more abundant in gaps than in forest understorey (Blake & Hoppes 1986). Those variables found to be significantly greater at non-scrape sites are associated with gap formation. Whereas variables associated with locally undisturbed forest, such as a defined tree size structure and greater foliage at higher levels, were significantly associated with scraped areas. Scraped areas are not found to be associated with water, which is in agreement with information offered by local pheasant trappers. Behaviourally, the noise of running water may mask calling bouts, and ecologically vegetation associated with these aquatic edge habitats (e.g. a dense understorey) may in some way be unsuitable for calling from.

Although not the primary purpose of the call counting method, the potential and problems of using such an approach for mapping calling males and in producing density estimates of the adult male population were emphasised during the project. The density estimate of 12 calling males/km^2 from this study should not be compared to Caleda (1986) (8.5 – 34.0 males/km^2) due to its secondary nature to the method in question, and being from a different topography and soil type using different methods.

Work is required to produce a complete and accurate distribution of *P. emphanum* with

an emphasis on highlighting those localities that remain ecologically intact and relatively undisturbed. The future conservation of *P. emphanum* requires a detailed knowledge of the levels of habitat alteration that it can tolerate as a result of the increasing human pressures on the island's forest resources. Our future aims include surveying areas of the island as yet unstudied, quantifying the requirements of suitable habitat, assessing variability in male calling behaviour, and considering whether the characteristics of male calls can be used as the basis for surveying adult breeding males.

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