

Thangon wetlands and reservoir 18°07'N 102°39'E	(Not marked ^{1,2})	N, 10a	160
Ban Thangon 18°08'N 102°37'E	(Not marked ^{1,2} ; Tha Ngon ³)	N, 10a	180
Ban Paknamkading 18°19'N 103°59'E	(Not marked ^{1,2})	N, 10a	150
Pakxan 18°23'N 103°39'E	(Pak Sanc ^{1,10} ; Muang Pakxan ²)	N, 10a	160
Pha Som/Nailang Limestone outcrop 18°00'N 104°19'E	(Not marked ^{1,2})	N, 10a	180-430
Savannakhét 16°34'N 105°45'E	(Savannakhét ^{1,3,5,10} ; Savannakhét ²)	C, 10a	150
Ban Napé 18°18'N 105°04'E	(Napé ¹ ; Ban Napé ² ; Napé ^{3,6,11} ; Na Pé ¹⁰)	C, 5b	560
Ban Thong Song, Savannakhét Prov. Locality untraced	(Not marked ^{1,2})	C, 10a	150
Champasak 14°54'N 105°53'E	(Not marked ¹ ; Champasak ² ;	S, 10a	100
Salavan 15°45'N 106°25'E	(Saravane ^{1,5,6,10,11,12,13} ; Saravan ²)	S, 10a	186
Pakxe 15°07'N 105°48'E	(Pakse ¹ ; Pakxé ² ; Pakse ^{7,10,12,13})	S, 10a	100
Phou Bachiang 15°07'N 105°52'E	(Not marked ^{1,2})	S, 10a	200-250 (peak 904)
Ban Thaténg 15°26'N 106°23'E	(Ban Thaténg ¹ ; Not marked ² ; Tha Teng ¹⁰ ; Tha-teng ¹² ; Thaténg ¹³)	S, 10a	842
Senamsai (Not marked) 14°41'N 106°38'E	(Not marked ^{1,2})	S, 10a	80
Muang Không 14°07'N, 105°51'E	(Khong ^{1,10,13} ; Muang Không ²)	S, 10a	80
Attapu 14°08'N 106°50'E	(Attapeu ^{1,10,12,13} ; Attapu ² ; Attapeu ⁶)	S, 10a	110
Khonphapheng Falls 13°57'N 105°59'E	(Not marked ^{1,2} ; Chutes de Khône ^{12,13})	S, 10a	70
Ban Thangbeng (Not marked) 14°47'N 106°58'E	(Not marked ^{1,2})	S, 10a	100
Ban Nasenphan (Not marked) 14°13'N 105°5'E	(Not marked ^{1,2})	S, 10a	80
Ban Samkhang 14°08'N 105°52'E	(Not marked ^{1,2})	S, 10a	80
Ban Senhom 14°31'N 106°19'E	(Not marked ^{1,2})	S, 10a	70
Ban Thakho (Not marked) 13°58'N 105°59'E	(Not marked ^{1,2})	S, 10a	70

Swamp Francolin *Francolinus gularis* survey technique: a case study from northern India

PHILIP J. K. MCGOWAN, SALIM JAVED and ASAD R. RAHMANI

The Swamp Francolin *Francolinus gularis* is considered shy and elusive as it is difficult to detect in tall wet grassland habitat. Between 21 March and 6 April 1993 surveys were conducted in and around Dudwa National Park in Uttar Pradesh, northern India. In addition to a wide ranging survey of the type previously used in searches for the species, dawn/dusk call counts were carried out at a single site. More birds were seen and heard at around dawn and dusk than during brief visits to areas of suitable habitat at other times of day. Whilst brief visits allow more sites to be covered, it is probable that some populations of Swamp Francolin will not be detected. We recommend a dawn and dusk visit to single sites during the calling period as the most efficient survey technique for this species.

INTRODUCTION

The Swamp Francolin *Francolinus gularis* inhabits the tall wet grasslands of the *terai* of South Asia, which stretches from western Uttar Pradesh in India eastwards along the Indo-Nepal border to Bangladesh and Assam in north-east India. This belt of low-lying land contains both wet and dry grasslands interspersed with moist deciduous forest, typically of sal *Shorea robusta* trees. Increasing human pressures on this land at the base of the Himalaya is resulting in the conversion of much of the grassland to agricultural land. The loss of this unique habitat is causing problems for the species which are restricted to the *terai* grasslands, such as the Swamp Francolin and the Swamp Deer *Cervus duvaucelii duvaucelii*, which may now number fewer than 100 individuals in Dudwa. This is a marked decline from around 5,000 in 1972.

The survival of the Swamp Francolin has been a cause for concern since the onset of draining of the damp areas in which it lives (Ali and Ripley 1983), such that the species is considered threatened (Collar *et al.* 1994). Furthermore, application of the Mace and Lande (1991) threat category criteria suggests that it is vulnerable to extinction (McGowan *et al.* 1995). This concern arises from the nature of disturbance that the species's habitat is currently subject to. Widespread drainage throughout the *terai* is making many areas unsuitable for the wet grasslands in which the francolin lives. The drained areas are then used for several purposes, such as the planting of agricultural crops, as pasture land for grazing cattle, and for road and house building. The usual reaction to this form of habitat degradation and loss is to create protected areas in which all forms of human activities are banned, or a management

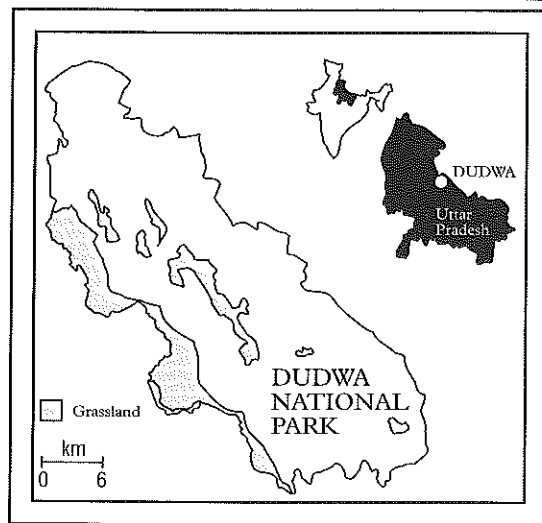


Figure 1. Map of Dudwa National Park showing major grasslands. Inset maps show the location of Dudwa in Uttar Pradesh and the position of Uttar Pradesh in India.

regime is practised. In order to prescribe sensible management practices, however, sound information is needed on the way in which the target species uses the variety of vegetation types which are available to it. Because the Swamp Francolin inhabits a vegetation type that is likely to have been subject to natural disturbance, such as periodic burning and grazing by large mammals, the survival of the species may well depend upon some form of management of its open grassland habitat, as is the case with the Cheer Pheasant *Catreus wallichii* in mid-altitude grasslands in the Himalaya (Garson *et al.* 1992).

Therefore, if the Swamp Francolin is to survive the current threats to its habitat, it is probable that its habitat will need to be managed to some degree. If such management is to be effective, it must be based upon reliable information about the species's use of available habitats and its response to habitat alteration such as planting of sugar cane crops. Providing such information is especially difficult in the case of the Swamp Francolin in its dense habitat of tall thick grassland, where sightings of birds are few. Consequently, we aimed to assess the practicality of conducting a detailed study on habitat use in the Swamp Francolin. Specifically, we wished to consider the detectability of the Swamp Francolin and its amenability to broad-scale surveys by comparing the rate at which we detected the species at dawn and dusk with the rate of detection during brief visits at other times of the day. These brief visits are typical of broad-ranging surveys which are concerned with covering large areas in a relatively short time (Javed and Rahmani 1991, Kaul and Kalsi 1990).

STUDY AREAS AND METHODS

Study areas

Fieldwork was conducted between 21 March and 6 April 1993 in the districts of Lakhimpur-Kheri and East Baraich in north-eastern Uttar Pradesh, north India, towards the western edge of the *terai*. The *terai* is dominated by forests comprised mainly of Sal *Shorea robusta* trees interspersed with grasslands which are often extensive. In many areas the grasslands remain at least damp throughout the year and these marshy patches contain tall, dense stands of distinctive grasses, such as *Sclerostachya fusca*, *Saccharum spontaneum* and *Arundo donax* and are called taals.

Three protected areas were visited. Most of our time was spent in and around Dudwa National Park (28°24'-28°40'N 80°34'-80°49'E), but Kishanpur Wildlife Sanctuary (28°27'N 80°22'E) was visited on 31 March/1 April, and Katerniaghat Wildlife Sanctuary (28°15'N 81°16'E) on 3/4 April. Information on the vegetation of these areas can be found in Anon. (1990) and Rahmani *et al.* (1991).

Single visit survey

Nineteen sites were visited under conditions similar to those used in previous wide-ranging Swamp Francolin surveys, namely for short periods of time at various times of day. In Dudwa, the following areas were surveyed for Swamp Francolins: Madhaya Phanta including Mothna Taal, Chapra Taal, Navalkhad (Neora Nalla), Bhaadi Taal, Bankey Taal, Kakraha Taal, Chedia Taal, Parbatia Phanta/Andhra Nalla, Base Camp, Churella Taal and grasslands adjacent to Salukapur Rest House and Sathiana Rest House. Outside the Park, Ajitnagar Taal, Ghola Taal, Gajrolla Taal and Tiger Haven were surveyed. Elsewhere, Jhaadi Taal and the Ul River bridge in Kishanpur, and Madhera Taal at the Girja barrage in Katerniaghat were visited (see Fig. 1).

Repeated sampling survey

For detailed survey work we chose a site which would allow repeat visits at dawn and dusk. Such a site had to be accessible in the dark so that we could arrive before sunrise and depart after sundown. Given that Dudwa lies within a Project Tiger area, it was also thought that we should choose an area in which walking in the dark would not prove dangerous. Ghola Taal, just outside the western edge of Dudwa National Park satisfied these criteria. Sampling stations along the south and south-eastern edges of the taal could easily be reached in 20 minutes from Sathiana Rest House.

Ghola Taal is an expanse of open water surrounded by *Saccharum spontaneum*, *Typha* spp., *Phragmites karka*, *Cyperus rotundus* grassland which

is grazed fairly lightly for the most part. Further from the taal, bordering the grassland, are crop fields, the majority of which were sown with sugar cane during our visit, or were being harvested. Other crops grown include pulses and wheat. The distribution of crops among the fields along the southern and south-eastern edges of the taal was mapped and the size of each field measured.

To investigate the utility of dawn and dusk choruses as a means of surveying areas for the Swamp Francolin, stations were manned from 50 minutes before sunrise to one hour after, and from 80 minutes before sundown to forty minutes after (*cf* Garson 1983). Information recorded at each encounter included bearing from observation station, estimated distance and habitat type. The number of call bouts heard was tallied for successive 5 minute periods to assess whether there was a time when the rate of calling reached a peak and, if so, if this was at a predictable time in the morning or evening. Sightings were also noted and one observer recorded the number of calls given in each bout heard from each location.

RESULTS

Call types

Two types of call were heard (Fig. 2). A series of single notes (Fig. 2 top) and a call described as *chuckeroo*, *chuckeroo*, *chuckeroo* (Tickell, in Ali and Ripley 1983) (Fig. 2 bottom). Both call types were often heard in the same bout, the single notes emitted before the *chuckeroo* calls.

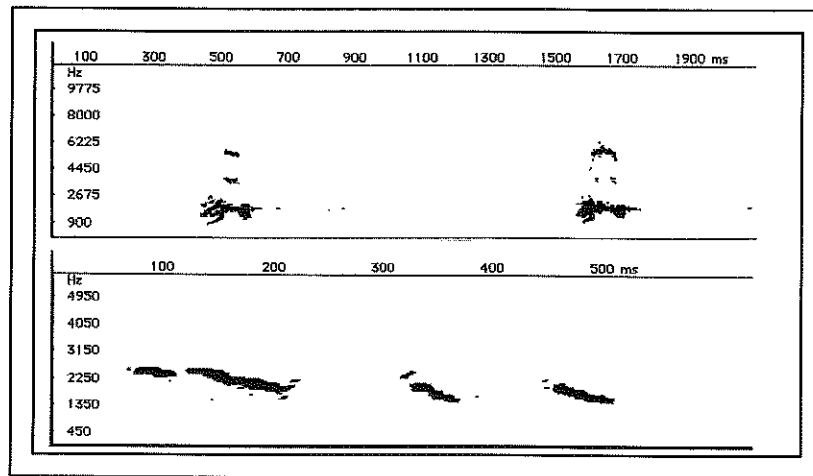


Figure 2. Sonograms of Swamp Francolin calls heard at Ghola Taal outside Dudwa National Park, northern India. Note that the frequency (vertical axis) and timescale (horizontal axis) are different for the two sonograms.

Marsh/ River name	Date	Time	Duration of visit (mins)	No. calling birds in each encounter	No. birds seen at each encounter
Chapra Taal	21/3	0810-1100	170	1	—
Madhraya (incl. Mothna Taal)	21/3	1610-1730	40	1,1,1	2,4
Navalkhad (Neora Nalla)	22/3	0700-0800	60	—	—
Chapra Taal	22/3	1720-1820	60	—	—
Parbatia Phanta	23/3	0750-1010	140	1,1	2
Kakraha Taal	23/3	1010-1055	45	—	—
Bankey Taal	23/3	1130-1210	40	—	—
Gajrolla Taal	24/3	1028-1146	78	1	—
Ghola Taal	24/3	1642-1830	108	1,1	—
Sathiana	25/3	(from base @0617)	—	1	—
Ghola Taal	25/3	0850-0935	45	1,1,1	—
Ajitnagar Taal	25/3	1622-1700	38	—	2
Ghola Taal	27/3	0735-1015	160	1,1,1,1,1	2,2,2
Bhaadi Taal	28/3	1535-1640	105	—	—
Bankey Taal	29/3	0650-0825	95	—	—
Kakraha Taal	29/3	1635-1700	25	—	—
Base Camp	29/3	1738-1800	22	1,1,1	—
Parbatia Phanta	29/3	1810-1830	20	1,1,1,1	—
Salukapur	30/3	0630-0710	40	1	—
Chedia Taal	30/3	0810-0825	15	1,1,1	—
Kakraha Taal	30/3	0830-1015	105	1,1	—
Chapra taal	30/3	1745-1830	45	—	—
Jhaadi Taal	31/3	1740-1845	105	—	—
Ul River	1/4	0655-0730	35	—	—
Jhaadi Taal	1/4	1125-1205	40	1	—
Ul River	1/4	1720-1840	80	—	—
Tiger Haven	2/4	1710-1830	80	1,1,1,1,1	1,2
Churella Taal	3/4	0950-1010	20	—	—
Girja Barrage	3/4	1740-1900	80	—	—
(incl. Madhera Taal)					
Girja Barrage	4/4	0615-0845	150	—	2
(incl. Madhera Taal)					
Totals			2046	37	21

Table 1. Dates and times of visits to waterbodies during the short visit survey for Swamp Francolins undertaken in Lakhimpur-Kheri and East Baraich Districts in north-central Uttar Pradesh, north India. The number of birds recorded during each visit is also given.

Short visit survey

The date, time and number of Swamp Francolins encountered at each site visited during the "usual" survey is given in Table 1. It should be noted that the short duration of some visits is a typical consequence of broad-ranging surveys attempting to cover several sites in a short period of time. From our data it is not possible to determine how reliable this method is for detecting presence, and hence implying absence, of Swamp Francolin at any given site.

It is worth noting, however, that birds were not always detected at sites where they were known to be present. For example, no calls were heard or birds seen at Chapra Taal on the evening of 22 March or 30 March, but a single call was heard during the morning of 21 March. Detection of birds was similarly unpredictable at Kakraha Taal.

Dawn/dusk survey

Five dawn and five dusk counts were conducted at Ghola Taal between 23 March and 6 April. Sunrise varied from 06h05 on 28 March, to 05h58 on 6 April and sunset from 18h16 on 23 March to 18h24 on 5 April. The number of birds heard calling and of those seen is given in Table 2. We have assumed that each calling location represents a pair of Swamp Francolin, given that the species is believed to be monogamous and is mostly seen in pairs (see Tables 1 and 2; Javed and Rahmani unpublished data). Based on this assumption we provide an estimate of the minimum number of individuals present in the portion of Ghola Taal that we surveyed. Because most of the birds that we saw called before, during or after the sighting, the minimum number of birds is typically estimated to be twice the number of calling locations recorded. The single exception is the morning of 2 April when one bird was seen flying and no calls were heard from either the place from where it flew or where it landed. A pair was seen at exactly the same point on the morning of 28 March.

Birds were heard nearly four times more often and seen nearly twice as often during the dawn/dusk survey than during the short visit survey (Table 3). As the short visit survey includes some sites where birds were not recorded at all, however, the lower encounter rates recorded during this survey may be biased by the absence of birds from some sites. The rate at which birds were heard at Ghola Taal during the short visit survey is slightly higher than for all sites, but is still very low in comparison with the dawn/dusk survey at that site. In contrast, birds were seen much more often at Ghola than elsewhere, and were recorded slightly more frequently during this survey than during the dawn/dusk survey at Ghola. However, it should be noted that all sightings at Ghola during the short visit survey were made on one morning, 27 March, and, that as numbers are so small, this has had a strong influence on this result.

Pattern of calling at Ghola Taal

The mean number of calls given in each 5 minute period during the dawn and dusk counts is given in relation to sunrise and sunset respectively in Fig. 3. The most striking result is that there are many more call bouts heard in the morning than in the evening.

In the morning some calls were heard as much as 50 minutes before sunrise and birds were often still calling sporadically when the sampling period ended

Date	No. calling locations	No. birds seen in each encounter	Minimum no. birds*
<i>Dawn counts</i>			
28 March	8	2,2	16
31 March	7	2	14
2 April	8	2,1,1,1	17
5 April	9	2	18
6 April	9	1	18
<i>Dusk counts</i>			
23 March	5	—	10
26 March	8	(1,1)	16
27 March	6	—	12
4 April	7	—	14
5 April	3	2	6

Table 2. Results of dawn/dusk counts of Swamp Francolins at Ghola Taal, near Dudwa National Park, Lakhimpur-Kheri, Districts in north-central Uttar Pradesh, north India. The number of birds recorded during each visit is also given.

* assuming calling locations represent pairs (see text). () denotes individual birds flying from and to same spots, and, therefore, probably a pair. Sunrise varied from 06h05 on 28 March, to 05h58 on 6 April and sunset from 18h16 on 23 March to 18h24 on 5 April.

Type of survey	Total duration (mins)	Encounter rate	
		No. birds heard per hour	No. birds seen per hour
Short visit survey	2046	1.09	0.62
Short visit survey (Ghola Taal only)	313	1.9	1.15
Dawn/dusk survey	1050	4.00	1.03

Table 3. The rates at which Swamp Francolins were heard and seen during both short visit and dawn/dusk surveys.

more than one hour after sunrise. There are however, two clear peaks of calling activity, the first 15 minutes before and the second 15 minutes after sunrise. The evening calling period appears less predictable, although there also seems to be more calling 15 minutes either side of sunset.

DISCUSSION

During all fieldwork Swamp Francolins were heard more frequently than they were seen. Consequently, more individuals are likely to be heard at a single site than seen, at this time of year, suggesting that observers should be familiar with the calls of the species before beginning a survey. Which of the two types of survey that we conducted should be used in any situation will depend upon the specific objectives of the fieldwork and any constraints of time.

Single visit surveys are likely to prove useful when several sites within a large area are to be visited in a short space of time. Our data suggest that the presence of Swamp Francolin in a site is likely to be revealed by such short surveys, but that occurrence at some sites will be missed. In contrast, listening for calls at dawn and dusk is much more likely to reveal the species' presence, and that if a site is sampled for several days, then it is highly unlikely that there will be no calls in an area which contain Swamp Francolins.

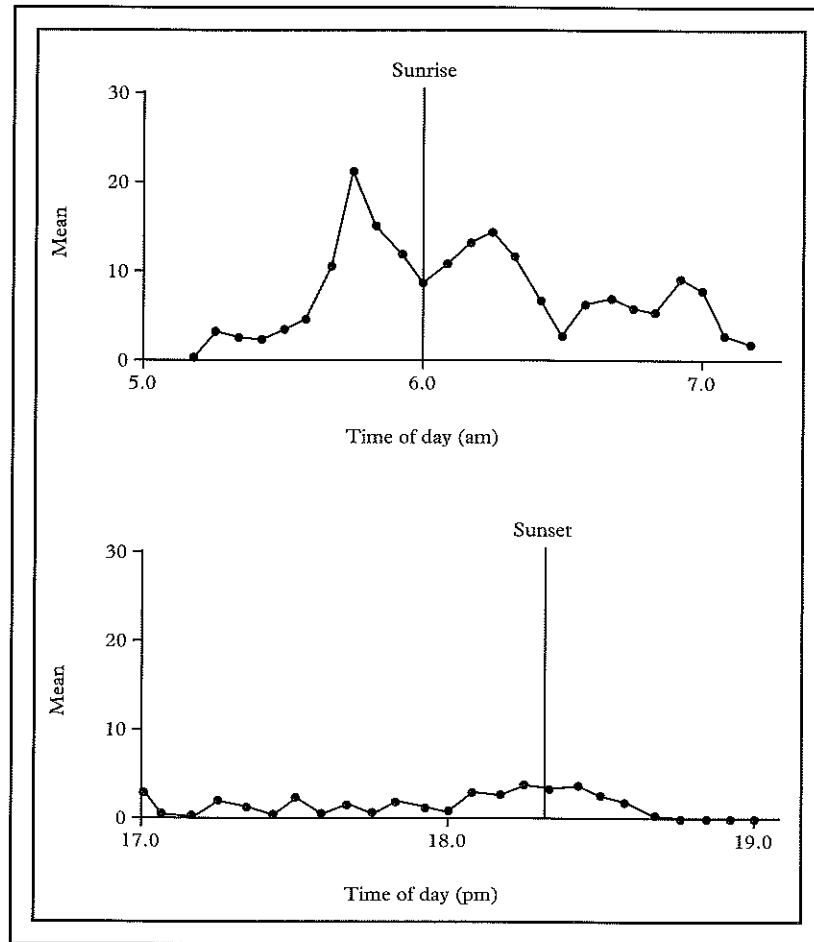


Figure 3. The pattern of calling of Swamp Francolins at Ghola Taal outside Dudwa National Park, Uttar Pradesh, northern India. The mean number of call bouts heard in each five minute period at dawn and dusk is given and mean sunrise and sunset times are marked.

There are two procedural differences between our two types of survey. The first is the duration of each visit and the second is the time of day at which the visit was made. In order to reduce the possibility that the species's occurrence at a site will be missed when conducting a single visit survey, fieldwork should be conducted at dawn and dusk. Our data suggest that manning survey stations from half-an-hour before to half-an-hour after sunrise will reveal presence of the species at a site during the calling season. Consequently, a visit to a site at dusk and the following dawn may be sufficient to detect the species if it is present at the waterbody being surveyed. This should allow reasonable field effort at each site in a wide-ranging survey.

The main finding of this study is the marked increase in Swamp Francolin activity at dawn and, to a lesser degree, dusk, when compared to other times of day, even early morning and late afternoon. Repeated visits to Ghola Taal revealed between seven and nine calling locations on each of the five mornings. This may mean that there are nine pairs of francolin present and that at least 77% of these are calling each morning. This compares with Cheer Pheasants at Wacchum in Uttar Pradesh, where 75% of Cheer Pheasant pairs are estimated to call on average before sunrise in June (Young *et al.* 1987). More information is needed on the distribution of calling Swamp Francolins on successive mornings (Bibby *et al.* 1992), however, before the number of calling birds on any one morning can be converted into a population density estimate.

The high rate at which the Swamp Francolin is encountered at dawn and dusk offers the possibility for a limited study of some aspects of the species's ecology and behaviour using non-invasive methods. For example, the use of available habitats by calling males can be assessed, which is especially important in non-protected areas such as Ghola Taal, where at least some birds call from sugar cane fields before they are harvested. This study should be able to supply the management recommendations required if the species is to survive in its man-affected habitat for the future. Such a study is now in progress.

The work was carried out under the auspices of a British Council-Indian Universities Grant Commission link. We gladly acknowledge the support of these agencies and the help of the link co-ordinators, Dr Peter J. Garson in the U.K. and Prof. Abbas H. Musavi in India. Additional support was provided by British Airways-Assisting Nature Conservation through the World Pheasant Association. Permission to work in Dudwa National Park was kindly granted by Mr M. C. Ghildiyal, Chief Wildlife Warden of Uttar Pradesh and Mr D. N. Suman, Director of Dudwa National Park. The assistance of the other park officials and staff is also acknowledged. Sarah Bush kindly produced the sonograms at The Open University and Tom Gardiner made the map, which is reproduced with permission from The World Pheasant Association and IUCN from *Partridges, quails, francolins, snowcocks and guinea fowl: status survey and conservation action plan 1995-1999*.

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New distributional records and natural history notes on the Whiskered Pitta *Pitta kochi* of the Philippines

O. F. JAKOBSEN and C. YDING ANDERSEN

The few observations of the Whiskered Pitta *Pitta kochi* have made information about this endemic bird of the Philippines very limited. During a general avifaunal survey in the Sierra Madre Mountains and in the Mount Pulog National Park sightings were made of this species. A total of 43 birds was recorded, which outnumbered all previous observations. The pitta was recorded from several new habitats at 500 to 2,200 m. Four birds were captured, including one juvenile, and released after measurements and blood samples for DNA analysis had been taken. For the first time, the song has been tape-recorded and translated into a sonogram. It is compared to species with similar vocalizations. Details of a possible breeding season, food and feeding habitats are also reported. The northern part of the Sierra Madre Mountains still contains habitat to sustain a viable population and the mountains currently represent a stronghold of this species.

The Whiskered Pitta *Pitta kochi* is endemic to the island of Luzon, and was first described by Brüggemann (1876). J. Whitehead, who discovered a number of endemic species to the Philippines during the end of the last century, stated that 'the rediscovery of this fine pitta was one of the most interesting results of my journey to the highlands of Luzon' (Whitehead 1899). As indicated by Whitehead, the Whiskered Pitta is a rare, local and seldom seen bird, and information about its distribution, habitat and biology is still very limited. Apart from a few observations almost a century ago, there are only scattered reports on the Whiskered Pitta (Dickinson *et al.* 1991). The first observations were confined to the montane and mossy forest of the Cordillera Central, near or on Mount Dana in Benguet Province. Later, in 1959, observations were made in the Cordillera Central at Mount Sablan, Mountain Province (Rabor's collection, University of the Philippines, Los Banos) and south-west of Mount Adams Peak, Ilocos Norte in 1993 (D. Allen *in litt.*). The Whiskered Pitta is also found in the Sierra Madre Mountains, where single birds have been recorded at Balian, Laguna Province in 1964 (McClure and Leclavit 1972), at Mount Cagua, Cagayan Province (Dickinson *et al.* 1991) and in Dalton Pass, Nueva Vizcaya in 1967 (McClure and Leclavit 1972). The two most recent observations are from Isabela Province on Mount Halmut at the base of Los Dos Cuernos (Anon. 1994) and at Minuma Creek in 1994 (C. Robson *in litt.*). In addition, it has been observed at Mount Isarog in Camarines Sur Province (Goodman and Gonzales 1990).

Two expeditions by the Danish Ornithological Society, the Department of Environment and Natural Resources, the Philippines and ICBP conducted