12.0 Status, Distribution and Management of Galliformes in Andaman and Nicobar Islands

K. Sivakumar[1], Ravi Sankaran[2] and Alok Saxena[3]

[1] Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand
Email: ksivakumar@wii.gov.in

[2] Salim Ali Centre for Ornithology and Natural History, Anaikatty, Coimbatore, Tamil Nadu
Email: florikin@gmail.com

[3] Department of Forests and Wildlife, Port Blair, Andaman and Nicobar Island
Email: dr_aloksaxena@rediffmail.com

Introduction

The Andaman and Nicobar Islands (6° 45' - 13° 41' N and 92° 12' - 93° 57' E) in the Bay of Bengal arch from Arakan Yoma in Myanmar in the north to Sumatra in Indonesia in the south (Saldanha 1989, Dagar *et al*. 1991). The Islands cover an area of 8,249 km^2, with a total coastline of 1,962 km; the Andaman group has more than 325 Islands (21 inhabited) covering 6,408 km^2, and the Nicobar group has over 23 Islands (12 inhabited) with an area of 1,841 km^2 (Singh 1981, Saldanha 1989). Islands have a hot, humid and uniform tropical climate and vegetation is mostly evergreen forests and mangrove.

Andaman and Nicobar islands form two of the 218 endemic bird areas of the world with over 270 species of birds (Vijayan *et al.* 2000). Of these, 106 species and subspecies are endemic to these islands. However, the diversity of galliformes in these islands is poor. Of the four species of galliformes that occur in the islands, two species *viz.,* the Blue Peafowl (*Pavo cristatus*) and the Grey Francolin (*Francolinus pondicerianus*) were introduced. The other two *i.e.,* Nicobar megapode (*Megapodius nicobariensis*) and the subspecies of Bluebreasted Quail (*Coturnix chinensis*), are endemic to Nicobars.

The Nicobar islands can be subdivided into three distinct subgroups based on ornithological affinities (Sankaran 1997). To the south lies the Great Nicobar group consisting of two islands over 100 km^2 in area, nine islets less than five km^2 in size, and a few rocks. Great Nicobar, Little Nicobar, Kondul and Pilo Milo are inhabited. Meroe, Treis, Trax, Menchal, Megapode, Cabra and Pigeon are uninhabited islets. Fifty-eight km north of the Great Nicobar group is the Nancowry group (middle Nicobar Islands), which consists of three Islands larger than 100 km^2, two of 36 and 67 km^2, three less than 17 km^2, two small islets and a few rocks. Seven Islands in the Nancowry group are inhabited. Tillanchong is the only uninhabited Island of the group. The northernmost subgroup comprises of Batti Malv and Car Nicobar, which is 88 km north of the Nancowry group. Batti Malv is uninhabited and Car Nicobar has a population of over 19,000 people.

Table 1 : Galliformes of Andaman and Nicobar islands.

S. No.	Species	Status	Distribution	Population status	WPA, 1972	Threats
1	Nicobar megapode *Megapodius nicobariensis*	Vulnerable (IUCN)	Nicobar islands	Coastal population around 800 breeding pairs	Schedule I	Habitat loss
2	Grey francolin *Francolinus pondicerianus*	Not known	Andaman islands	Not known	Schedule IV	Least concern
3	Blue-breasted Quail *Coturnix chinensis*	Common in Nicobars	Nancowry group and Car Nicobar islands	Common in the grassland areas	Schedule IV	Habitat loss
4	Indian Peafowl *Pavo cristatus*	Rare	Andaman islands	Not common	Schedule I	Least concern

The Nicobar megapode

The Nicobar Megapode *Megapodius nicobariensis*, a mound nesting megapode, is confined to the Nicobar group of Islands in the Bay of Bengal, separated from its nearest congener by a distance of over 1,500 km. The polytypic Nicobar Megapode has two subspecies *viz., M. n. nicobariensis*, distributed in the Nancowry group of Islands north of the Sombrero channel, and *M. n. abbotti*, distributed in the Great Nicobar group of Islands lying south of the Sombrero channel (Hume and Marshall 1878, Abdulali 1964, Ali and Ripley 1983, Fig. 1).

Distribution of the Nicobar megapode

Historically, the Nicobar Megapode occurred on most Nicobar Islands (Hume 1874; Dekker 1992; Sankaran 1995b) barring Car Nicobar (Butler 1899), Chaura (Abdulali 1967) and Bati Malv (Sankaran 1995). There were a few records from the Andaman group of Islands (Hume 1874) and from the Coco Islands further north (Abdulali 1964). None of the records from the Andaman group are of recent origin and the species is now believed to be absent there (Sankaran 1995 a & b). It may have existed on Car Nicobar a century ago but no traces of mounds were found there (Sankaran 1995 a&b). The Island of Chaura is only 11.5 km from Teressa and, considering the megapode's occurrence on the more remote Tillanchong, there is no reason why it should not have existed in Chaura (Sankaran 1995). The presence of what was most probably an ancient mound indicates that the megapode did occur on Chaura historically (Sivakumar 2000). However, both Car Nicobar and Chaura are much too densely populated for the species to exist there now.

***Megapodius nicobariensis abbotti* Oberholser, 1919**

M. n. abbotti is common in all coastal forests, particularly uninhabited or sparsely inhabited areas, on Great and Little Nicobar. It is believed to have disappeared from all areas colonised by mainlanders (Dekker 1992), but they continue to survive in small remnant pockets (Sankaran 1995). Seven of the nine islets in the Great Nicobar group have habitat suitable for megapodes and two (Cabra and Pigeon) are too small. Small populations of megapodes are present on six of these seven islets. The seventh islet, Pilo Milo is inhabited, and the islet is mostly under coconut palms. Megapodes are apparently extinct on this islet. Over 50% of the forests of uninhabited Meroe, Treis, Trak, Menchal and Megapode Island have been converted to coconut plantation, and populations of megapodes on these islands are threatened (Sankaran 1995a).

***Megapodius nicobariensis nicobariensis* Blyth, 1846**

M. n. nicobariensis occurs on seven islands of the Nancowry group (Sankaran 1995). On Camorta, Katchall and Trinkat, it is patchily distributed, with very few locations having active mounds. Good populations of megapodes exist on Teressa and Bompoka and the density of active mounds is similar to that of Great and Little Nicobar. Tillanchong is mainly hilly with very little level coastal forest, thus megapodes are naturally scarce except in the low lying coastal forests.

Population status of the Nicobar megapode

Of the total 687 km long coastal line of the Nicobar megapode lands, 328 km long coastal forest is identified as the 'Potential Coastal Habitat for Megapode' and remaining 359 km long coastal forests are identified as 'Non-conducive coastal habitat for megapode' (Sivakumar, 2007). Presently, about 800 breeding pairs of the Nicobar megapode occur on the coastal habitat of the Nicobar islands after tsunami, which is nearly 70% less than what was reported a decade before by Sankaran (1995).

Grey francolin *Francolinus pondicerianus*

This species was introduced into the Andaman islands in 1890s. Sporadic sightings of this species were recorded in the deciduous forests especially from the south Andaman. However, detailed distribution and status of this species in Andaman islands is not known. Grey francolin has not been recorded from the Nicobar islands.

Blue-breasted Quail *Coturnix chinensis*

In the Nancowry group of islands of Nicobars, the central portion of the most of islands are grasslands, often extending to the coast itself (Sankaran 1995b). Various explanations exist for the occurrence of these grasslands, the main being that they are man-made. However, there is no historic evidence that colonizers cleared forests for animal husbandry. The existence of the Blue-breasted Quail in these grasslands an indication that these grasslands are so old that not only did colonization take place, but speciation occurred as well. The subspecies *C.c.trinkutensis* present here is believed to be endemic to these islands.

Blue-breasted Quail is common on Car Nicobar, Trinket and Camorta islands. Around 12-15 sightings of this species was recorded during the 1993-94 surveys (Sankaran 1995). During the rapid survey that was carried out in the grasslands of Camorta, Trinket, Teressa and Bamboka islands during June 2006, a total of 54 birds were recorded. Maximum number of birds were recorded in the grasslands of Camorta (29 birds) followed by Teressa, Bomboka and Trinket. Blue-breasted Quail were sighted often with Yellow-legged Buttonquail *Turnix tanki*, whose, sightings was not rare in the Nicobar islands.

Blue Peafowl *Pavo cristatus*

The Blue peafowl is one of the introduced birds in Andaman islands. Their distribution is restricted to in and around the Port Blair and Ross Island in the Port Blair. Total number of Blue Peafowl in Andamans may not exceed 50 individuals.

Threats

Habitat loss and degradation

Habitat loss due to anthropogenic activities appear to be a major cause for the decline in the population of Galliformes. The Nicobar megapode preferred to construct mounds on sandy and sandy-loam substrates of coastal forests, probably because these substrates are easier to dig into, and having superior drainage (Sivakumar 2000, Sivakumar and Sankaran, 2001). The coastal habitat of the Nicobar islands are mainly composed of sand and sandy-loam soil and this would account for the clumped distribution of the Nicobar Megapode towards the coastal region. Coasts are also favoured by human beings who could establish their hamlets surrounded with horticulture crops such as coconut, and areca nut. As a consequence of increasing human population, there is a continuous expansion of the coconut plantation in the coastal areas which has ultimately led to the shrinkage of megapode habitat. Habitat loss remains the single biggest threat to the megapode even after a decade (Sankaran, 1995a). Grassland habitat is another most favourable habitat for people especially after the tsunami for the purpose of housing and plantation. Due to encroachment of grasslands for housing and plantation the Blue-breasted Quail is loosing its potential habitats rapidly.

Inadequate Protected Area coverage

The existing Protected Area (PA) coverage is inadequate in the Nicobar islands to safeguard the megapode and Blue-breasted Quail. Currently, less than 40% of potential coastal habitat of megapode is under protection. Out of these, *M. n. abbotti* has been fairly protected in Great Nicobar but *M. n. nicobariensis* was not given much attention earlier and this apathy has pushed this sub-species into the verge of extinction. Tillanchang Wildlife Sanctuary (WS) is the only PA for *M. n. nicobariensis,* covering <3% of total habitat of this sub-species, though 27% of population occur in this island which is uninhabited. Remaining 73% of *M. n. nicobariensis* is not protected and their habitat appears to be under severe threat after tsunami due to post-tsunami rehabilitation process. The largest population of the Nicobar megapode occurs in the Great Nicobar Island. Major portion of this Island is notified as Biosphere Reserve, but has not been properly designed to protect the prime coastal habitat of the Nicobar megapode sufficiently owing to settlement of indigenous people all along the coastal areas (Sankaran, 1995, Sivakumar, 2007). Entire habitat of the Blue-breasted Quail is out of the PA coverage of the Andaman and Nicobar Islands.

Introduction of Alien Invasive Species and agricultural plants

It is widely known that island ecosystems are particularly vulnerable to alien invasive species, and that their impacts are especially severe (Veitch & Clout 2002) on ground living birds such as galliformes. After tsunami, the State Administration had a plan to supply 400,000 domestic chicken and 9,000 ducks to farmers and tribals which may threaten the native birds including megapode by transmitting diseases. Introduced dogs and cats are also known for threatening egg laying megapodes (Sivakumar 2000). After tsunami, the state agricultural departments initiated several projects as a part of the rehabilitation process, to restore the livelihood of locals including the plantation of cashew in a larger scale in the Nancowry group of islands. This again poses a grave threat to already shrunken habitat of megapodes and Blue-breasted Quail.

Hunting and egg collection

The Nicobar Megapode is protected under Schedule I of the Indian Wildlife (Protection) Act (1972) whereby hunting and trade is prohibited. However, as per the Section 65 of the Indian Wildlife (Protection) Act, 1972, nothing in this Act shall affect the human rights conferred on the Scheduled Tribes of the Nicobar Islands in the Union territory of Andaman and Nicobar Islands by notification of the Andaman and Nicobar Administration, No.40/67/F, No.G635, Vol. III, dated the 28th April, 1967. As per this Act, the ethnic tribes of the Nicobar Islands (Nicobarese and Shompen) are allowed to continue hunting on wild animals including the megapodes.

It was believed that the Nicobarese do not hunt or collect eggs of megapodes extensively because megapodes have spiritual and medicinal values (Sankaran 1995) but this spiritual value seems to be gradually disappearing among tribals (Sivakumar, 2007). Traditionally, Nicobarese are hunter gatherers but in the course of modernisation they have taken to more of horticultural activities and less of hunting. After tsunami, they lost most of the horticulture crops in Great Nicobar, Little Nicobar, Pilo Milo islands and partially in Nancowry group of islands which forced them to hunt whatever they could get from the forest. One to five air guns could be seen in a household and megapodes is one of the favourite birds.

Mainlanders are also known for hunting the megapodes and Blue-breasted Quail. This is borne out by the fact that

areas of mainlander settlement or their presence have no sign of megapodes or highly depleted population, especially in Nancowery group of islands and some part of Great Nicobar. Compared to areas of mainlander settlements, the indigenous people habitations are still recognized as the potential coastal habitat for megapodes and megapodes are seen there. However, this may change in future as lifestyle of native people is gradually matching with that of the mainlanders.

Evidence for megapode hunting *i.e.,* leg traps on or near the mound were also seen near the Shompen-inhabited areas such as Lawful and Trinket Bay of Great Nicobar Island, where several large sized old active mounds were found. Leg traps were also seen in Tillanchang WS possibly by the Nicobarese who occasionally visit this island for coconut harvesting or non-native fishermen who illegally camp here.

Post tsunami impact

The tsunami waves have washed away most of the planted as well as wild coastal coconut and areca nut palms and plantations (Sankaran, 2005) of these have therefore become important for the future survival of tribals in this region. It is very likely that these plantations will encroach the majority of the potential coastal habitats of the Nicobar megapode and its associated species if proper safety measures are not taken in this regard. After tsunami, most of the low-lying coastal areas got submerged and the megapodes had built their mounds in evacuated villages. But on the return of the tribals, the megapodes were hunted. More than 95% of coconut plantations on the southern group of Nicobar islands were washed away, which was the major source of income for tribals. In years to come, it is expected that tribals will be left with fishing and hunting of wildlife for their survival apart from livelihood support from the Government. Each tribal family has one to four air guns. The Nicobar megapode, Pied Imperial Pigeon, Andaman Green Imperial Pigeon, Green Pigeon and Nicobar Pigeon are most favoured by the tribals.

Management perspectives

Management of Habitat

The Nicobar megapode is included in the Schedule I of the Indian Wildlife (Protection) Act, 1972 and this species is considered as globally 'Vulnerable' (IUCN, 2006). This was in response to its dwindling population size and being the flagship species of the Nicobars. Around 70 % of the population of Nicobar megapode had disappeared over the last 12 years (Sivakumar, 2006). The major reason for the sharp decline is believed to be the tsunami which washed away their habitat along with nests. However, habitat destruction and hunting are the major human induced factors that still adversely affect the megapodes, and these forces are likely to continue until a serious conservation programme is implemented. Restoration of the megapode habitat on the west coast of the Great Nicobar Island is urgently required. Most of the people from this coast were killed by tsunami with the exception of 10 persons who survived in rehabilitation camps. Since west coast of this island is no more suitable for people to live, the entire coastal area need to be included in the existing PA and no plantation projects should be initiated in this region. More than 100 km long coastal line of west coast has a lot of potential to become a better habitat for megapodes as well as other coastal species including sea turtles to nest. A conservation awareness programme needs to be initiated immediately through tribal captains of Nicobarese villages. This programme should clearly address reasons for the decline in Nicobar megapode populations, and how these trends can be arrested or reversed (Dekker *et al.* 2000). Since the habitat destruction is a major human induced cause for the decline of megapodes, it needs to be communicated properly. Further plantation or developmental activities must be contained and expansion of plantation area in forest land should not be allowed. Since there is a strong relationship between poverty, development and wildlife conservation, further developmental activities aimed to eliminate poverty need to be encouraged without undermining the importance of wildlife. Proper Environmental Impact Assessment studies by genuine experts should become a mandatory step prior to initiation of any developmental projects in Nicobar islands. Major developmental/infrastructural projects (for example a proposal to make Great Nicobar a free port for international shipping at the mouth of the Galathea river) should not be considered as they will damage the highly sensitive insular ecosystem and its wildlife. Long-term habitat monitoring in Nicobar islands needs to be initiated with help of experts. A section in the Forest Department should to be dedicated exclusively for the research and monitoring part of the wildlife and its habitat.

Review on Existing PA Network for the Nicobar Megapode and Blue-breasted Quail:

At present, two National Parks (NP) and two WSs afford protection to the megapode populations and there are no PAs that holds populations of Blue-breasted Quail. The four PAs that have megapode populations are: Great Nicobar NP, Galathea NP, Megapode WS, and Tillanchong WS. It is recommended that an entire portion of west coast and southern part of the Great Nicobar Island needs to be included in the adjoining NPs as these areas are devoid of human settlement and known to have better habitats for megapodes. This will also protect all other insular fauna of this region including the nesting beaches of sea turtles. Little Nicobar needs to be declared as a 'Conservation Reserve' (CR), so that the degraded habitat can be restored with the participation of local communities. Entire Nancowry

group of islands could be declared as a CR. Since these islands are thickly populated and heavily disturbed, CR concept will help to restore the natural habitat as well as protect wildlife of this region, without jeopardizing the livelihood of local human populations. Indigenous people must be given a major stake in the proposed CRs.

Management of alien invasive species

The symptoms of avian cholera were noticed in megapodes when the outbreak of this disease killed more than 50% of introduced domestic fowl in the Great Nicobar in 1997 (Sivakumar, 2007). After tsunami, the State Administration had a plan to supply 400,000 domestic fowl and 9,000 ducks to farmers and tribals which may threaten the native birds including megapode. Introduced domestic dogs and cats are also known for threatening egg laying Nicobar megapodes (Sivakumar 2000). The following actions are recommended to manage the invasive species in the habitat of megapodes. Awareness programme targeting all stakeholders is required to get support from the local communities to manage the invasive species such as domestic fowl, cat and dogs in Nicobar islands. Immediate removal of all major vertebrate invasive species from the PAs in the Nicobar islands.

Hunting and egg collection

After tsunami, hunting on megapodes seems to be on increasing manifolds. Though, the Nicobarese have traditionally attached cultural value to megapodes, scarcity of animal protein has forced them to hunt megapodes intensively. The two aboriginal tribes of Nicobar islands *viz.,* Nicobarese and Shompens are exempted from the Indian Wildlife (Protection) Act, 1972. Considering the changing lifestyle of these tribes, this immunity should be reviewed. In particular, the Nicobarese should be brought under the purview of the Wildlife (Protection) Act, 1972, while Shombens may be allowed to hunt wild animals. Awareness programme targeting all people through tribal captains needs to be initiated. This programme should clearly address reasons for the decline in Nicobar megapode populations, and how these trends can be arrested or reversed (Dekker *et al.* 2000). Since, hunting is the second major human induced cause for the decline of megapodes, it needs to be communicated properly. Use of air guns should be prohibited in the PAs and in the proposed CRs. Food for guns programme need to be initiated. Guns from the tribal people may be compensated with food by opening up controlled poultry or piggery farms. This will also give alternative employment opportunities to tribal people.

Research and monitoring

Scientific knowledge on the ecology of a species is necessary for *in situ* management of populations. Though, the habitat use and social organisation of this species is fairly known (Sivakumar, 2000, Sivakumar & Sankaran 2003), it is important to know the factors that govern the population dynamics of this species. Following projects are proposed for future research on this species.

Project 1: Long-term monitoring of the Nicobar megapode and its habitat

Since, information on population trends is essential for understanding the long-term conservation status of this species (Dekker *et al*. 2000), one of the objectives of the current survey was to identify permanent sampling sites to monitor the populations of megapodes for a longer period. In this context, more than 30 transects have been identified which represent various habitats of Nicobar islands and a simple data sheet has been prepared to collect data from this transect. People who have working knowledge of Hindi or English can use this data sheet with one day training. The data collected can be used to highlight particular regions of concern and establish where further conservation effort should be targeted. This project has also been mentioned in the IUCN Megapode Conservation Action Plan (Dekker *et. al.* 2000).

Project 2: Population dynamics of the Nicobar megapode

This project is to investigate the viability of small populations by using Population Viability Analysis (PVA) and other models. This project should culminate in a strategic assessment of the best way forward for the long-term conservation of the species. This project has also been mentioned in the IUCN Megapode Conservation Action Plan (Dekker *et al.* 2000).

Project 3: A detailed study on social organization and breeding biology of the Nicobar megapode

Though an intensive study on breeding biology and social organization has been carried out (Sivakumar 2000), it is essential to address several questions that have still remained unanswered, particularly, the survival rate of chicks, solitary birds, process of pair formation, reasons for low clutch size, and multiple mound use of a pair. These aspects need to be investigated.

Project 4: A detailed survey on the Nicobar megapode in interior forests

Till now there was no detailed survey on the megapode population occurring in the interior forests. In the current survey, some transects were laid to look for mounds but the detection probability was very low due to inaccessible terrain and thick vegetation cover. It is essential to know the population size of megapodes inside the interior forests.

Project 5: Habitat use by the Nicobar megapode

A study on this aspect was carried out (Sivakumar 2000), but there has been no investigation on the availability and utilization of food resources. Nest site selection by the Nicobar megapode that occur in interior forests needs to be investigated.

Conclusion

Though the diversity of galliformes in Andaman and Nicobar islands is low, the presence of endemic Nicobar megapode, which is considered to be the flagship species of the coastal forests of Nicobar islands shows the importance of galliformes conservation in the islands. The Department of Forest and Wildlife has taken several conservation actions to safeguard the galliformes especially the Nicobar megapode and its habitats in the islands, which includes the declaration of four PAs in the megapode range. After tsunami, there was an obstacle to carry forward the conservation plan of the Nicobar megapode which could be sorted out as soon as the people are rehabilitated successfully.

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