

PR76

STATUS AND ECOLOGY OF THE ANDAMAN CRAKE

SACON Library



PR76



**Salim Ali Centre for Ornithology & Natural History
Coimbatore**

Status and Ecology of the Andaman Crane

Project funded by the Ministry of Environment & Forests, Govt. of India

FINAL REPORT

Lalitha Vijayan
Principal Investigator

N. Ezhilarasi
Research Fellow



**Salim Ali Centre for Ornithology & Natural History,
Coimbatore**

2007



CONTENTS

PAGE

ACKNOWLEDGEMENT

SUMMARY AND RECOMMENDATIONS

i-v

Chapter- I INTRODUCTION

1

Chapter- II STUDY AREA

6

2.1. Climate

2.2. Rainfall

9

2.3. Flora

11

2.4. Fauna

14

2.5. Intensive study area

15

2.5.1. Chidiyatapu Biological Park (South Andaman)

15

Chapter- III STUDY SPECIES AND METHODS

16

3.1. Study species

16

3.1.1. Adult

16

3.1.2. Immature

17

3.1.3. Juvenile

17

3.2. Methods

17

3.2.1. Bird Survey

17

3.2.2. Territory

18

3.2.3. Vegetation

19

3.2.4. Habitat evaluation

19

3.2.5. Activity

19

3.2.6. Faecal Analysis

21

3.2.7. Invertebrate abundance

22

3.2.8. Breeding

23

Chapter-IV STATUS AND DISTRIBUTION OF THE ANDAMAN CRAKE

25

4.1 Previous records

25

4.2 Sightings of the Andaman Crake in different islands

27

4.2.1. Outer islands

27

4.2.2. Main islands

29

4.3. Habitat-wise distribution

37

4.5. Distribution along elevation gradient

38

4.6. Flock size

38

4.7. Discussion

39

	Chapter-V ACTIVITY BUDGET AND PATTERN	
5.1.	Activity budget	42
5.2.	Details of major activities	44
5.2.1.	Feeding	44
5.2.2.	Calling	44
5.2.3.	Maintenance activities	44
5.2.4.	Resting	46
5.2.5.	Agonistic behaviour	46
5.2.6.	Activity Budget of breeding birds	46
5.2.7.	Roosting	46
5.3.	Activity Pattern	47
5.4.	Discussion	50
	Chapter-VI FOOD AND FEEDING	
6.1.	Food of the Andaman Crake	52
6.1.1.	Food items recorded by direct observation	52
6.1.2.	Indirect method	53
6.2.	Food availability at the feeding sites	53
6.3.	Foraging pattern	54
6.4.	Foraging habitat	56
6.4.	Foraging method	58
6.6.	Discussion	58
	Chapter-VII BREEDING BIOLOGY	
7.1.	Breeding season	61
7.2.	Nest and nest-site characteristics	64
7.2.1.	Nest	64
7.2.2.	Nest-site	64
7.2.3.	Nest and nest site variables	65
7.3.	Nest plant selection	69
7.8.	Clutch	70
7.9.	Incubation	70
7.10.	Chicks	70
7.10.	Nest success and failure	73
7.11.	Predators on the breeding ground	75
7.12.	Discussion	76
	REFERENCES	80
	Appendix -I	92
	Appendix -II	97

Plate	Title	
1	Major vegetation types in Andaman Islands	13
2	Feeding habitat of the Andaman Crane	57
3	Nesting details of Andaman Crane	71
4 a,b,c	The Andaman crane	72

Table	Title	
2.1.		
2.2.	Monthly percentage of relative humidity in the study area	10
2.3.	Land cover of Andaman Group of Islands in 2003 (in Sq Km)	14
4.1.	Previous records of the Andaman Crane	25
4.2.	Existing record of the population status of the Andaman Crane	26
4.3.	Number of the Andaman Crane in outer islands during 2004-2007	29
4.4.	Number of Andaman Crane in the main islands during 2004-2007	31
4.5.	Habitat- wise distribution of the Andaman Crane	37
5.1.	Kolmogorov-Smirnov Test for activity patterns between seasons	47
6.1.	Values (z) of Kolmogorov-Smirnov Test comparing the feeding pattern of different seasons	56
6.2.	Foraging habitat characteristics of the Andaman Crane	56
7.1.	Breeding chronology of the Andaman Crane in 2005-2006	62
7.2.	Nest materials and its % of occurrence (n=10)	64
7.3.	Nesting locations of the Andaman Crane	65
7.4.	Nest variables of the Andaman Crane	65
7.5.	Nest-site and Non-nest site variables of the Andaman Crane	67
7.6.	Factor loadings of the nest-site variables of the Andaman Crane with the principal components	67
7.7.	Comparison of successful and unsuccessful nests of the Andaman Crane	68
7.8.	Frequency of tree species used for nesting and preference (PI)	69
7.9.	Measurements of the Andaman Crane at different stages	73
7.10.	Success and failure of the eggs encountered	74

Figure	Title	
2.1.	Location of Andaman and Nicobar Islands	7
2.2.	Andaman Islands	8
2.3.	Rainfall and number of rainy days in the intensive study area during 2004 to 2006	9
4.1.	Locations of survey of Andaman Crane during 2004-07 in North Andaman	32
4.2.	Locations of survey of Andaman Crane during 2004-07 in Middle Andaman	33
4.3.	Locations of survey of Andaman Crane during 2004-07 in Baratang, South Andaman	34
4.4.	Locations of survey of Andaman Crane during 2004-07 in South Andaman	45
4.5.	Locations of survey of Andaman Crane during 2004-07 in Little Andaman	46
5.1.	Activity Budget of the Andaman Crane during breeding and non-breeding seasons	42
5.2.	Activity budget of the Andaman Crane in different seasons	43
5.3.	Activity budget of the incubating bird of Andaman Crane	43
5.4.	Activity pattern of the Andaman Crane in winter	48
5.5.	Activity pattern of the Andaman Crane in summer	48
5.6.	Activity pattern of the Andaman Crane in south-west monsoon	49
5.7.	Activity pattern of the Andaman Crane in North-east monsoon	49
6.1.	Food items of the Andaman Crane recorded from direct observation	52
6.2.	Food of the Andaman Crane recorded from faecal samples	53
6.3.	Abundance of invertebrates in the Andaman Crane's feeding area	54
6.4.	Correlation of Foraging pattern of the Andaman Crane with temperature	55
6.5.	Foraging pattern in various seasons	55
6.6.	Foraging method of the Andaman Crane	58
7.1	Number of nests recorded in different months during 2005-2006	62
7.2.	Correlation of number of nests with a) Rainfall, b) Number of Rainy days, and c) Maximum Temperature	63
7.3.	Distribution of nests with respect to the forest edge	66
7.4.	Causes of nest failure	74
7.5.	Nest failure recorded in different stages of incubation	74

ACKNOWLEDGEMENTS

We are highly thankful to the Founder Director of SACON, V.S. Vijayan for his support and encouragement and for providing facilities which helped us to conduct the study successfully.

This project would not have been materialized without the cooperation and assistance from the officials of the Forest Department of Andaman and Nicobar Islands. Our special thanks go to S. R. Mehta and S. S. Patnaik the Principal Chief Conservators of Forests; Khazan Singh and S.S. Choudhary, Additional PCCF & Chief Wildlife Wardens; N. Kala, and Alok Saxena, Conservators of Forests; R. S. C. Jayaraj, K. Ravichandran, Graham Durai, DCFs; Parithosh Saha, Sabhu. K. Thomas, and P.N. Pal ACFs for their full support during the project period. The interest shown and help given by the Conservator Pratap Singh deserve special mention. Several field staff such as the Range Officers, Deputy Rangers, Camp Officers, Watchers of the Forest Department, Andaman District and our Field Assistants provided excellent cooperation and their valuable contribution is dully acknowledged.

We express our gratitude to Hon. Lt. Governor Prof. Ram Kapse, Chief Secretary, Deputy Commissioner, and Superintendent of Police, Port Blair for their interest in the project and providing necessary permissions, especially to visit tribal reserve areas in Middle, South and Little Andaman. We re grateful to the Police Officers in tribal reserve area of Middle and South Andaman and officers of the Public Works Department for their support in providing accommodation in many places.

We have benefited from the comments from the expert committee of the MoEF and the Research, Advisory and Monitoring Committee of SACON. We gratefully acknowledge the support provided by Naseem Ahmed, the Scientist in-charge at MoEF. P. V, Sreekumar helped us in identifying the plants. We are thankful to the

SUMMARY AND RECOMMENDATIONS

The Andaman Crane *Rallina canningi* is a data deficient bird endemic to the Andaman Islands, India. Except some occasional sighting records, no detailed information was available on the ecology and biology of this crane which are very vital for the conservation of the species. Hence, a detailed ecological study was carried out on this species with the following specific objectives to:

1. Assess the status of the Andaman Crane and its distribution in the Andaman islands
2. Understand the ecology and biology of the Andaman Crane, and
3. Identify crucial areas for the conservation of this species and suggest probable measures for conservation and management.

Fieldwork was conducted from February 2004 to March 2007 in the Andaman Islands with two intensive study areas, namely Chidiyatapu (c 40ha) in South Andaman and Pathilevel (c 30ha) in North Andaman. Surveys were carried out throughout the Andaman Islands covering the main as well as outer islands using direct observation and calls, mainly playback. Feeding and breeding biology and other behavioural studies were conducted by direct and indirect methods, but mostly by direct observation of the birds.

Most of the detection (65%) of the Andaman Crane was of pairs, occasionally solitary and rarely in family groups. In all, 521 individuals of the Andaman Crane were observed in 2196 points counted; the mean encounter rate was 0.24 bird/ point. Totally 37 islands lying outside the main islands with 15 very small, 9 small, 5 medium, 5 big, 2 large and one very large islands were covered. In these 37 islands, 92 birds were observed in 766 points; the mean encounter rate was 0.10 ± 0.13 bird/point with a

maximum in very large island (0.34). Among the main islands, a total of 79 localities or sites was sampled; 429 Andaman Crake were counted in 1430 points in the four main islands, namely Little Andaman (LA), South Andaman (SA), Middle Andaman (MA), and North Andaman (NA). The mean encounter rate was 0.28 ± 0.10 bird / point with the maximum in SA (0.35) followed by NA (0.34), MA (0.28) and LA (0.14) showing no positive correlation with the size of the islands. Percentage sighting had positive correlation with the area covered (points). Habitat-wise analysis showed the maximum encounter rate (0.31 bird/point) in the semi-evergreen forests followed by moist deciduous (0.29), evergreen (0.27), and minimum in mangrove (0.02), which did not have any correlation with the area available or surveyed showing its preference for the semi-evergreen and evergreen forests. The survey results also showed a clumped distribution. No crake was recorded in littoral forest, plantation and cultivation.

Ecology and behaviour of the species was studied. Activity budget and pattern were assessed by direct observation. A total of 2714 observations was made. During non-breeding season, it spent most of the time for foraging (69%) followed by calling (21%), maintenance (7%), whereas during breeding season calling was recorded more (49%) than feeding (43%). This Crake produced four major types of calls; more during morning, noon and evening with variations according to seasons, the maximum in south-west monsoon ie. breeding. They roosted in pairs on thin branches of small trees.

Foraging ecology of the Andaman Crake was studied by direct method using Focal Animal Sampling. Food items were identified by direct and indirect methods. In total 960 foraging observations were made. Direct observation of food items showed relatively larger food items during monsoon season. The principal food items included earthworm, caterpillar, and snail. Totally 60 faecal samples of the Andaman Crake were collected and analyzed. From the faecal samples we could record only the mouthparts of ants and termites, and broken pieces of shell (snail) and cuticle of

beetles. No significant differences in the food items were recorded within the season but significant differences were found among different seasons. The frequency of food intake by the Crake corresponded well with the invertebrate abundance or availability showing the opportunistic nature of its feeding. The principal feeding techniques was pecking (91%) followed by flake method (7%). There were no significant differences in the method within the season and between seasons. The Andaman Crake spent the maximum time for feeding (65.06%); it was very high (69%) in the non-breeding season while it was only 42.4% in the breeding season. Feeding activity of the Crake in different seasons varied. Foraging habitat of the Andaman Crake was forest area dominated by trees with undergrowth of different species and ground having fine soil with leaf litter of around 4 cm above ground. The location of foraging area was characterized with tall trees, moderate canopy cover (55%), low ground cover (30.53%), moderate light intensity (44.61%) and high number of small trees (GBH < 20cm)

We found 155 nests of the Andaman Crake among which only 22 were with eggs. One pair made more than four nests and chose one nest for egg laying and others for roosting with chicks. The Andaman Crake nested during Southwest monsoon, June – September and at times extending up to October with a peak during July and August. Nesting season had significant positive correlation with rainfall and number of rainy days. Distribution of nests was within 200m from the edge of the forest. Nest was cup-shaped made up of leaves and twigs built amidst the leaf litter on the ground. Nests were located in five different locations, most of them between the buttresses on ground (86.6%). Nest – site variables were compared with those of non-nesting sites; significant differences were recorded in number of big trees around the nest (10.2 ± 6.5), distance from water (16.8 ± 17.2 m). The Principal Component Analysis gave two more factors as important, namely canopy cover and concealment. Comparison between the nest-site characteristics of the successful and unsuccessful nests revealed the above four factors as significant and, concealment as highly significant; but the Discriminant function analysis showed the large tree in front of the nest as the crucial factor.

Out of the 155 nests, 148 were on 24 species of trees mostly found between the buttresses at the base. The Crane showed a higher preference for *Tetrameles nudiflora* (Thipok), and *Pterocarpus dalbergioides* (Paduak) (23.3% each) followed by *Terminalia katapa* (Badam) (3.33 %), and *Pterygota alata* (Lakko) (11.33%). All these trees are deciduous species and have large buttresses.

Breeding biology of this species was studied by observing 155 nests of which 22 were with 85 eggs. Clutch size was 4-6; egg whitish and oval. Both parents took part in incubation and rearing chicks. Incubation period (N=7) was obtained for the first time, 21 days. Success was only 20% in 32% of nests. The fledglings could be observed for some time occasionally and their success could not be understood. Failure of nests were found to be mainly because of predation (50%) followed by abandoning by parents (35.71%), and damage (14.29%). Abandoning was more in the early stages of incubation while predation was more in the later stages. Abandoning and damage were partly because of human disturbance.

Habitat destruction, hunting and introduced predators are the major threat faced by the Andaman Crane for its survival. The study shows that the bird is a habitat specialist of moist forests with clumped distribution. It was extremely difficult to estimate the population because of low visibility and difficulty in estimating the distance of calls in the different types of forests. Taking into consideration of the IUCN criteria, such as the restricted range of distribution and a fragmented population with declining locations, area of occurrence estimated to be <5000km² (around 4000 km²), area of occupancy of around 700 km², this species needs to be considered as Vulnerable under threatened category.

The Andaman Crane has low nesting success and fledgling success could not be recorded. The population is naturally fragmented and there has been a loss of the

species from many localities because of the habitat loss and degradation. Considering all these factors, management regimes should ensure that adequate protection is given to this species, especially during the breeding season, and full protection of the crucial areas from any kind of human and related disturbances. Major localities of occurrence and abundance of this species are given below: (1) North Andaman: Radhanagar, Pathilevel to Ramnagar, Kishorinagar, Paschimsagar, Kalpong and Arielbay, (2) Middle Andaman: Bakulthala, Jarawa Reserve, Webi to Burmadera, and Kadamthala, (3) South Andaman: Mount Harriet, Dhanikari, Wandoor, Brijgunj, Jarawa Reserve, Jarawa Creek to Kattakhari in Barratang and, one outlying island, namely Rutland Island (towards the southern part), and (4) Little Andaman: White Surf waterfall, Dugong Creek and 22nd km. It is essential to ensure protection for these sites for the conservation of this rare endemic species. Some of the above areas are partly or fully protected and many others are near human settlements. Southern part of the Rutland Island was already proposed to be declared as the Andaman Teal Sanctuary (Vijayan and Sankaran 2001). The habitat of this Crake in the localities without full protection may be declared as Sanctuaries or Conservation Areas delineating the boundaries depending on the status of the land and feasibility.