

Status Of Pied Tit *Parus nuchalis* in Narayan Sarovar Sanctuary, Gujarat, India

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Introduction

The Pied Tit *Parus nuchalis* is endemic to India, with a widely disjunctive distribution in the western and southern parts of the country (Ali & Ripley 1987). In western India, it is recorded from northern Gujarat (including Kachchh district) and central and south-central Rajasthan (Ali & Ripley 1987).

The Pied Tit is largely confined to secondary forest, especially thorny scrub-forest, and its description is given elsewhere (Ali & Ripley 1987; Tiwari & Rahmani 1996). Concern over the status of this species has recently increased, as BirdLife International (2001) has given it the status: 'vulnerable'. Hussain *et al.* (1992) and Tiwari & Rahmani (1996) reported its status for some parts of Gujarat and concluded that the population has declined due to habitat loss and a lack of nest-hole availability. An attempt was made to assess its status in the Narayan Sarovar Sanctuary, Gujarat, India. Despite having high ecological value, huge deposits of economically valuable minerals in the Narayan Sarovar Sanctuary forced the state government of Gujarat to reduce the sanctuary's area, for industrial development, from 765.79km² to a mere 444.23km². Hence, the present study was carried out between August and December 1998 to highlight the ecological importance of the Narayan Sarovar Sanctuary and the areas de-notified for industrial purposes.

Study area

Narayan Sarovar Sanctuary (23°27'–23°42'N 68°30'–68°57'E) is located in Kachchh district, in the western-most

part of the country. The Kori creek borders the sanctuary on the north-west and mangrove forest on the west. There are no prominent land features on the eastern, northern and southern sides. The north-eastern part is undulating, interspersed with small hill ranges, extending in an east-west direction. The north-western and western parts are flat,

gently sloping towards the Arabian Sea. This sanctuary harbours the last remnants of the true thorn forests, comprising stands of *Acacia nilotica*, *A. senegal*, *Salvadora oleoides* and *S. persica* with *Euphorbia nivulia*, *Capparis decidua* and *Zizyphus nummularia* shrubs interspersed with grass patches. Some of the areas are encroached and dominated by the exotic *Prosopis juliflora*. The climate is arid and temperatures range from

10°C–40°C. A few ephemeral rivers and rivulets drain the sanctuary. Rainfall is scarce and erratic.

There were 56 villages inside the sanctuary before de-notification. Now there are 32. The total human population residing within the sanctuary is 11,200 (1991 census), alongwith 14,400 head of livestock (1992 census).

To carry out a systematic survey, the old sanctuary boundaries (before de-notification) were superimposed on a 1: 50,000 Survey of India topographical map of the area, which was divided into 5x5 km grids. About 40 such grids fell within the sanctuary limits. These grids were further subdivided into 1x1km sub-grids. Due to constraints in time and manpower it was decided that at least ten percent of the area would be surveyed. 76 grids were selected, on lot basis,



Pied Tit *Parus nuchalis*

Table 1. Details of sightings of Pied Tit in Narayan Sarovar Sanctuary

Grid No.	Number of Pied Tits	Species richness	Abundance
2H08	4	20	201
3H21	1	19	83
3F24	2	32	339
3D01	2	30	169
4A08	2	*	*
4G22	2	*	*
5G04	1	14	93
6A20	2	33	459
6F02	4	25	265

* = Not recorded.

for the study. Care was taken to select at least one sub-grid in each large grid so that the entire sanctuary would be spatially and uniformly represented.

As the distribution of Pied Tit is reportedly patchy (Tiwari & Rahmani 1996), it was decided to perambulate the grids to locate the species rather than use existing census methods. Perambulation was done in such a way that a minimum of micro-habitats and birds would be missed from our observation. Similarly, caution was taken to avoid repetition. The time taken for perambulating a grid varied from 01:20–01:40hrs depending on the terrain. During perambulation the number of micro-habitats encountered, the number of bird species seen, and their abundance, were recorded. Once a Pied Tit was spotted, the time, micro-habitat, number of individuals and their activity were noted, after which one of us tried to follow the bird while the remaining continued their perambulation. A Pied Tit was followed and its behaviour recorded till it disappeared from sight. No census was done in extreme weather.

Status

A total of 16 Pied Tits were sighted in seven of the 76 sub-grids perambulated during the survey (Table 1; Fig. 1). In addition, two pairs were sighted in grids that were not selected for the survey. These birds were recorded while returning after surveying other grids and hence no data was collected on species richness and abundance of birds from those grids. Except on two occasions, Pied Tits were largely sighted in solitary pairs. They were seen in grids with high bird species richness, which ranged from 14–33. No statistically significant association of the Pied Tit with other avian species—Yellow-fronted Pied Woodpecker *Dendrocopos mahrattensis* $r = -0.37$; Rose-ringed Parakeet *Psittacula krameri* $r = -0.09$; Yellow-throated Sparrow *Petronia xanthocollis* $r = -0.07$; Hoopoe *Upupa epops* $r = -0.41$; Common Myna *Acridotheres tristis* $r = 0.11$; and Brahminy Starling *Sturnus pagodarum* $r = 0.1$; $N = 9$, $p = 0.05$ —was evident during this study. Only once was it seen in a mixed foraging flock.

Tiwari & Rahmani (1996) reported that Pied Tits preferred scrub forest, consisting of *A. leucophloea*, *A. nilotica*, *P. cineraria*, *Ziziphus jujuba*, *C. aphylla*, *S. oleoides*, *S. persica* and *Grewia tenax*. The present study indicates that they were distributed patchily and in low numbers in the Narayan Sarovar Sanctuary and sighted mainly in large *Acacia* / *Prosopis* / *Salvadora* patches along dry river-beds / nullahs (Table 2).

We tested this preference of theirs in the field and invariably found Pied Tits.

Behaviour

The Pied Tit was not as shy as reported by Tiwari & Rahmani (1996) as we could approach it as close as 1–2m when it fed on fruits of *C. decidua*. Interestingly, we found it difficult to approach closer when it gleaned insects from bark / twigs / leaves, as it moves quickly between branches and trees. It may be a feeding strategy rather than shyness. Insects and fruits comprised its diet as reported by Tiwari & Rahmani (1996). Of the 65 foraging records, gleaning (60, 92%) was more frequent than other forms of feeding like fruit exploitation (3, 5%) and leaf tearing (2, 3%). Although the bird was observed feeding on fruits of *C. decidua*, it is not clear whether it fed on the fruit or on insects present inside it. Twigs ($n = 32$, 49%) were gleaned more often than leaves ($n = 28$, 43%). Twig-gleaning was performed on *A. nilotica*, *A. senegal*, *P. juliflora* and *P. cineraria*, while leaf-gleaning on *S. oleoides* and *S. persica*. This may be a strategy the Pied Tits adopt to efficiently adjust to the architecture of the plants. Although Gokula (1998) reported leaf-tearing as a predominant foraging method in the Great Tit *P. major*, it was used less frequently by Pied Tits. One of the Pied Tits, while foraging, moved up to a distance of about 700m from the place where it was first sighted.

Although the Pied Tit is vocal, it very often gives a break while actively calling. Apart from the calls described by Tiwari & Rahmani (1996), it also gave a call similar to that of a Purple Sunbird *Nectarinia asiatica*, which was heard twice during the survey.

Association with other species

Tiwari & Rahmani (1996) reported that this species is associated with dead and decaying trees, where it roosts and nests in holes made originally by Yellow-fronted Pied Woodpeckers. But in the present study no such association was evident between tits and snags / woodpecker (Table 3). Of the eight grids, Yellow-fronted Pied Woodpeckers were found in only two grids. Similarly, no statistically significant

Table 2. Habitat details of the grids where Pied Tits were sighted

Grid No.	Number of micro-habitats	Micro habitats
6A20	4	<i>A. senegal</i> patch, fallowland, <i>C. decidua</i> with openland, Riverine patch*
5G04	1	<i>A. nilotica</i> patch*
6F02	3	Grassland, Riverine (<i>A. nilotica</i> dominated) patch*, fallowland
3H21	2	<i>A. nilotica</i> , <i>A. senegal</i> and <i>E. nivulia</i> patch*
2H08	2	<i>P. juliflora</i> patch*, fallow-land
4A08	1	<i>A. nilotica</i> patch*
4G22	1	Riverine patch (<i>Acacia</i> spp. dominated)
3F24	4	Fallowland, <i>E. nivulia</i> patch, <i>P. juliflora</i> patch, Riverine patch (<i>P. juliflora</i> dominated)
3D01	4	Riverine (<i>P. juliflora</i> and <i>A. nilotica</i> dominated)*, <i>A. nilotica</i> and <i>E. nivulia</i> patch, <i>A. senegal</i> patch, waterbody

* = Patch where Pied Tit was sighted

Table 3. Species richness and abundance of cavity nesters recorded in the grids where tit was sighted

Grid No.	Species richness	Name of the bird species	Abundance
6A20	3	Yellowfronted Pied Woodpecker	1
		Rose-ringed Parakeet	13
		Yellow-throated Sparrow	4
5G04	1	Yellowfronted Pied Woodpecker	1
6F02	0	Nil	
3H21	1	Hoopoe	1
2H08	0	Nil	
4G22	*	*	*
4A08	*	*	*
3F24	3	Rose-ringed parakeet	65
		Common Myna	4
		Brahminy Starling	2
3D01	4	Brahminy Starling	4
		Rose-ringed Parakeet	1
		Common Myna	6
		Spotted Owlet <i>Athene brama</i>	1

* = Not recorded

association was found even between Pied Tits and cavity-nesters. It can be speculated that the Pied Tit shows a strong association with a micro-habitat rather than bird species / snags in non-breeding season, at least in this sanctuary.

Conservation measures

The long-term survival of this species depends purely on the continued availability of its preferred habitats as mentioned above. A majority of such habitats have recently been converted into agricultural lands. Further, de-notification of the sanctuary by the government of Gujarat

has enhanced this practice of change of land use. Hence immediate attention is required to protect these habitats from further degradation. Further monitoring and ecological studies of the species are a pressing need to save it from local extinction.

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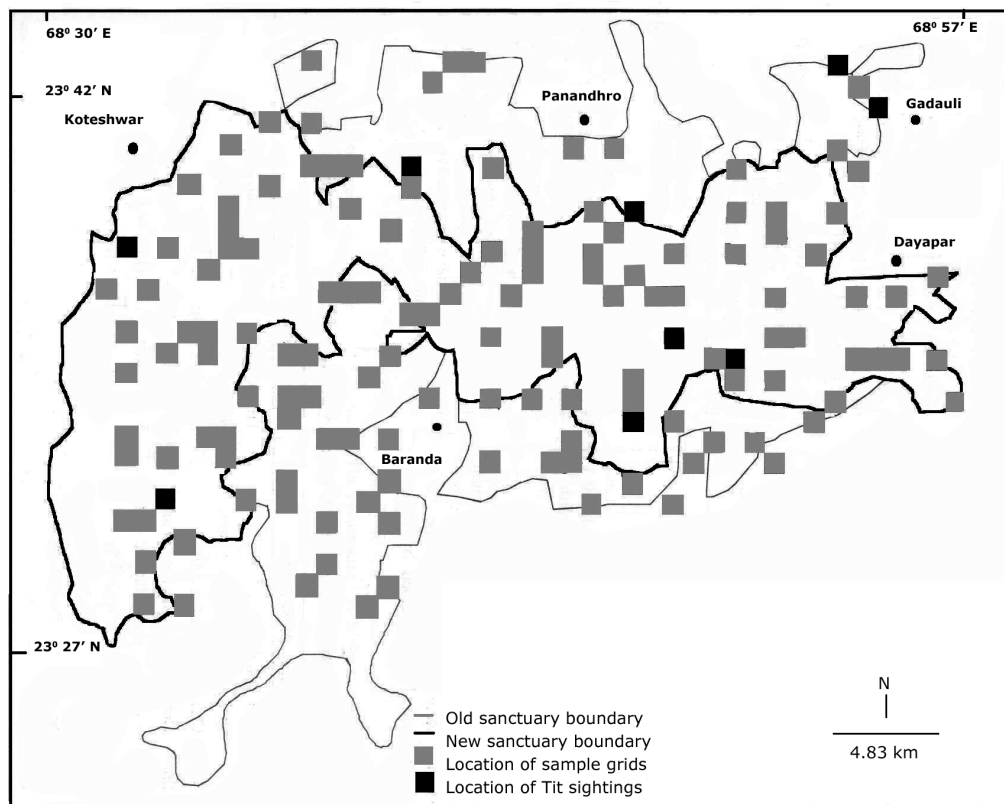


Fig. 1. Distribution map of Pied Tit in Narayan Sarovar Sanctuary, Gujarat, India.