Observations on the globally threatened Pied Tit *Parus nuchalis* at Jessore Sanctuary, Gujarat

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Abstract

I discuss observations made on the globally threatened Indian endemic Pied Tit *Parus nuchalis* during a study conducted between July 2003 and February 2005 at Jessore Sanctuary, northern Gujarat. Twelve sightings of the species (18 individuals) were obtained chiefly in thorn-scrub habitats dominated by *Acacia senegal*. Several avian co-habitants were listed from the area and its overlap with Great Tit *P. major* explored. Pied Tit appears to be an intrinsically rare species with a mean encounter rate of 0.18 individuals/km and a relative abundance of 0.0034 at Jessore. This rarity combined with a patchy distribution, disjunct range, limited availability of nesting sites and human pressures on its thorn-scrub habitat point at the need to review its conservation status at the global and national levels.

Introduction

Pied or White-naped Tit *Parus nuchalis*, a globally threatened species endemic to India, is patchily distributed over two disjunct regions. The northern part of its range lies in the states of Gujarat and Rajasthan, while the southern portion, is in the dry lands of the Deccan peninsula (Hussain *et al*. 1992; Grimmett *et al*. 1998). Its range and population have undergone a significant decline in the recent past (BirdLife International 2001). Its ecology and conservation status have mainly been documented in Kachchh (Ali 1954–1955; Hussain *et al*. 1992; Tiwari & Rahmani 1997; GEER & GUIDE 2001). Inadequate understanding of its ecology, specifically its abundance, habitat use and distribution patterns, owing to patchy occurrence and rarity throughout its range are the major hindrances in its conservation as it's thorn forest and thorn-scrub habitats are fast disappearing and degrading (BirdLife International 2001). Here, I discuss aspects of the ecology, behaviour and conservation status of this species based on a study of the avifauna of Jessore Sanctuary, northern Gujarat, conducted from July 2003 to February 2005.

Study area

Jessore Sloth Bear Sanctuary (24°20'N 72°23'E; hereafter, Jessore) is located in the southern part of the Aravalli Hills in Banaskantha district of Gujarat (Fig. 1). Spread over an area of 180.66 km^2, it is connected through degraded forest corridors with two other nearby protected areas—Balaram-Ambaji Wildlife Sanctuary (Gujarat) on its east and Mount Abu Wildlife Sanctuary (Rajasthan) on its north/north-east. The topography is hilly and rugged with the highest point being the Jessore Hill (*c.* 1,000 m). The Banas and Sipu Rivers flow along its southern and northern boundaries, respectively. The vegetation types at Jessore include mixed dry deciduous forests and open woodland on hills to degraded deciduous-scrub, thorn forest and thorn-scrub in the plains (Singh 2001; *personal observation*). The thorn forests and thorn-scrub occur in the western and south-western parts of Jessore. The chief features of this habitat include a sandy soil and extensive ravine/gully formations with predominantly thorny vegetation. The major tree species include *Maytenus emarginata*, *Acacia senegal*, *A. tortilis* (planted), *Butea monosperma*, *Zizyphus mauritiana*, *Wrightia tinctoria* and occassional *A. nilotica* and *Prosopis chilensis*, while shrubs and bushes include *Balanites aegyptiaca*, *Dichrostachys cinerea*, *Zizyphus nummularia*, *A. auriculiformis*, *Capparis aphylla*, *Crotolaria* spp., *Calotropis procera*, and *Tephrosia* spp. Since the past three decades, mesquite *P. chilensis*, an invasive exotic tree has encroached more than half of the original thorn-scrub habitat in the valleys, stream beds, fringes of reservoirs and lower portions of hills (Singh 2001).

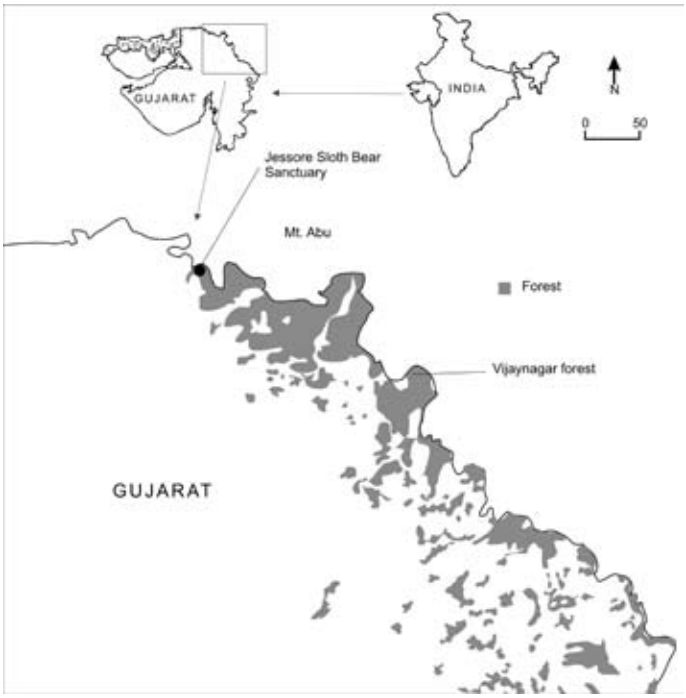


Fig. 1. Jessore Sloth Bear Sanctuary, Gujarat, India.

Table 1. Sightings of Pied Tit *Parus nuchalis* at Jessore Wild Bear Sanctuary, Gujarat

Date	Time (hrs.)	Number	Habitat	Vertical Location	Activity / Remarks
18.xii.2003	0900	2	AM-Sc	1–3 m	F-C
26.i.2004	0811	2 *	AM-Sc	1–3 m	F-C
26.i.2004	1700	1 *	AMW	1–3 m	F
11.iii. 2004	1726	1 *	AMW	3–8 m	F
29.vii. 2004	1100	2	AAPF	1–3 m	M-C
27.viii. 2004	1659	2 *	AAnW	1–3 m	F-C
29.viii. 2004	0745	1 *	AZW	3–8 m	P-C
30.x. 2004	0855	1 *	AC-Sc	1–3 m	P-C
01.xi. 2004	1045	2	AM-Sc	0–1 m	F-C
26.i. 2005	0824	2 *	ZBW	1–3 & 3–8 m	F-C
26.i. 2005	1115	1	AC-Sc	1–3 m	F-C
27.i. 2005	1015	1	AMW	1–3 m	F-C
Total	—	18	—	—	—

Abbreviations: AAnW=*A. senegal-A. pendula*?—Woodland; AAPF=*A. senegal-A. tortilis-P. chilensis*—Forest; AC-Sc=*A. senegal-C. auriculiformis*—Scrub; AM-Sc=*A. senegal-M. emarginatus*—Scrub; AMW=*A. senegal-M. emarginatus*—Woodland; AZW=*A. senegal-Zizyphus* spp.—Woodland; ZBW=*Zizyphus-Butea*—Woodland. C=calling; F=foraging; M=moving; * sighted on transect.

Methods

Data collection was carried out on 38 field days by walking 1–2 km long line transects, and along existing trails in representative habitats. On sighting Pied Tit, I recorded the number of individuals, habitat, vertical location (in intervals of 0–1, 1–3, 3–8 and above 8 m), and activity, and associated bird species (including their interactions). When I sighted Pied Tit on trails, I followed it and recorded its behaviour. Over 90 min of behavioural observations were made of both, pairs, and solitary individuals. Its encounter rate was derived as the number of individuals divided by the distance walked. Mean encounter rate was the average of encounter rates of all transects. Relative abundance was the proportion of individuals of Pied Tit out of the total number of individuals of all species sighted on all transects. Common and scientific names follow Manakadan & Pittie (2001).

Results & discussion

Abundance and habitat use: I recorded 18 individuals of the species in a total of 12 sightings. Of these, six sightings were of pairs and the rest were of solitary individuals. All sightings of the species occurred in thorn forests or thorn-scrub habitats (Table 1) and consisted of adult birds. Pied Tit had a mean encounter rate of 0.18/km and its relative abundance was 0.0034 (Trivedi 2005) clearly indicating the rarity of the species. This seemed to be a case of constitutional rarity (as against apparent rarity caused by sampling; see Terborgh *et al*. 1990), which is generally the case with raptors, large-bodied bird species, and endemics. Ali (1954–1955) regarded Pied Tit as, 'fairly common in Kachchh but capriciously patchy; sparse and sporadic in the Palanpur area', based on his surveys in the 1940s. Surveys in Kachchh by Hussain *et al*. (1992) and Tiwari & Rahmani (1997) showed its status as 'bleak' and 'uncommon', respectively.

Thorn forests with gently undulating, broken-hilly country were the typical habitats of the species in Jessore. Pied Tit was not sighted in mixed deciduous forests in higher hilly areas or dense *Prosopis* thickets. With one exception, the species was sighted in habitats dominated by *A. senegal*. No sighting was obtained on hills higher than 300 m and the *Anogeissus*-mixed forests above this altitude. Occurrence of all the sightings of the species in thorn forest habitats with *Acacia senegal* was in accordance with reports of its occurrence in similar habitats, albeit with variable species composition, having *Acacia nilotica, A. senegal, A. leucophloea, A. catechu, Prosopis* spp., *Salvadora* spp., *Zizyphus jujuba, Euphorbia nivula* and *Capparis decidua* in Kachchh and Rajasthan (Hussain *et al*. 1992; Tiwari & Rahmani 1997; GEER & GUIDE 2001; Tiwari 2001; Sharma 2004). Thus, the species is clearly partial to thorn forests with *Acacia* spp., in association with other thorny trees and shrubs, except in its southern range where it was seen among forests containing tamarind *Tamarindus indus*, *A. leucophloea* and *Albizzia amara*. Use of dry riverbeds reported earlier (GEER & GUIDE 2001) was also observed thrice during the present study. 83% of the sightings were within 1 km radius of the nearest human habitation or road. Its distribution was 'patchy' and mainly confined to southern and south-western parts of Jessore. The reiteration of the rarity of Pied Tit through this study coupled with its patchy distribution highlights the need for concentrated and sustained efforts in monitoring population trends.

Avian co-habitants and overlap with Great Tit Parus major*:* Bird species generally associated with Pied Tit and/or co-occurring in the same habitat types mainly included a few endemic resident species and some migrants, especially warblers. Based on their occurrence on the transects/trails where Pied Tit was sighted (Trivedi 2005), Yellow-eyed Babbler *Chrysomma sinense*, Marshall's Iora *Aegithina nigrolutea*, Red Collared-Dove *Streptopelia tranquebarica*, Plain Prinia *Prinia inornata*, Bay-backed Shrike *Lanius vittatus*, White-browed Fantail *Rhipidura aureola*, Orphean Warbler *Sylvia hortensis*, Lesser Whitethroat *S. curruca*, Spotted Flycatcher *Muscicapa striata* and Black Redstart *Phoenicurus ochruros* were its common co-habitants.

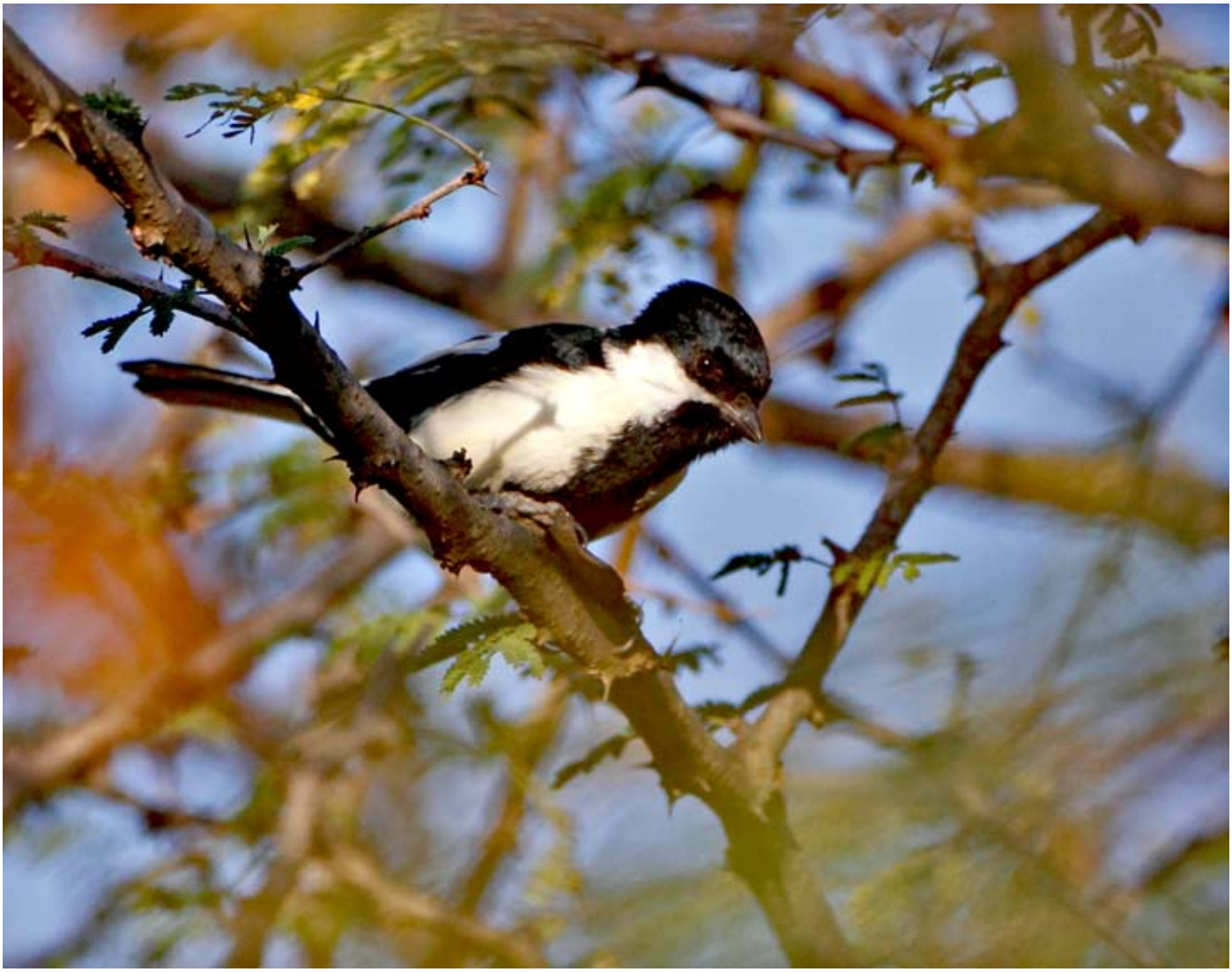
Great Tit and Pied Tit were separated at Jessore by both altitude and vegetation type used as all sightings of the former (n=19) were in hilly mixed deciduous forests, while the latter inhabited the thorn and thorn-scrub habitats in gently undulating country (n=12). On two occasions (16.6 % of the sightings) I observed Pied Tit in mixed-species associations. The species associated with it in flocks were—White-browed Fantail and Lesser Whitethroat (two flocks); Black Redstart, Franklin's Prinia *P. hodgsonii*, Small Minivet *Pericrocotus cinnamomeus*, Common Iora *A. tiphia* and Red-vented Bulbul *Pycnonotus cafer* (one flock each). Hence, my

observations do not agree with Tiwari (2001), wherein the two species were seen in a single flock near Jessore. There appears a clear spatial segregation between the two species in many areas (Ali 1954–1955; Lott & Lott 1999), as also observed at Jessore. For instance, in the Saurashtra peninsula of Gujarat, where Pied Tit is absent, Great Tit inhabits the thorn forests (Khachar 1996; *personal observ.*), while in Kachchh only Pied Tit is present in such habitats (Ali 1954–1955). Several species of Paridae are known to be important flock forming species and it is likely that Pied Tit plays such a role as also indicated by its loud and varied calls. I once found that its call attracted the attention of Orphean Warbler, Red-vented Bulbul and various prinias, which moved towards the calling bird.

Behavioural observations: Pied Tit was highly restless and vocal while foraging. Its foraging method may be described as foliage-and-bark-gleaning. It mainly employed the 'hop-glean' and 'hang-glean' methods while feeding. Rarely was it seen to hover. Its foraging height was between 1–3 m in most cases (75% observations; n=12); thrice it foraged higher (3–8 m) and once very close to the ground (Table 1). During behavioural observations, the species was seen feeding on insects (and spiders?), which were gleaned from leaves, bark, and fruit or flowers. It was also seen feeding on fruits of *Maytenus emarginatus* and inflorescence of *Butea monosperma*, although it was not possible in the latter case to ascertain whether it fed on insects or nectar.

Pied Tit was highly vocal and uttered frequent contact calls resembling "*chi…chi…chi*", "*chik…chik*" and a harsh "*chuck…chuck*" call. Its song comprised whistling notes—"*chwee…chi.chi.chweet*" or "*chwee…chi.chi.chi.chi…chweet*". The first and last syllables were longer and produced a shrill whistle-like effect. The middle syllables (*chi*) were generally uttered two to four times. The gap between the first and the second syllable was more than between the following notes. The species sang from treetops. The call was loud and audible up to 100 m. Calls of the species were of immense help in detecting it during surveys, as also noted by others (Tiwari & Rahmani 1997; Lott & Lott 1999). No breeding or nesting behaviour was observed. Pied Tit was not as 'wary and shy' as reported in earlier studies (Hussain *et al*. 1992; Tiwari & Rahmani 1997; Lott & Lott 1999). In one instance, I observed the birds at *c*. 3 m for almost 15 min. Their sightings in proximity of human dwellings also points to their tolerance of human presence (Jones 2007).

Conservation status: Hussain *et al*. (1992) documented 45 sightings comprising atleast 76 individuals from published literature, between 1844 and 1991. Tiwari & Rahmani (1997) reported another 25 sightings with 41 individuals. Later, Tiwari



Ramki Sreenivasan

Pied Tit *Parus nuchalis* at Phot Mahadeo, Kachchh, January 2009.

(2001) reported 15 sightings and 27 individuals (four from northern Gujarat and 23 from Rajasthan) from a survey carried out in its northern distribution range in 1996. In the last decade, about 40 sightings and 65 individuals have been reported in literature from the northern parts of the species' range (Chhangani 2002; GEER & GUIDE 2001; Mehra 2004; Sharma 2004; Tehsin *et al*. 2005; Dookia 2007; Sangha 2008). This, together with the sightings reported in this paper and other stray sight records of the southern population (Lott & Lott 1999; Jones 2007) constitute a maximum of 165 records and 250 individuals over 150 years. Five of the surveys/studies (Hussain *et al*. 1992; Tiwari & Rahmani 1997; Tiwari 2001; GEER & GUIDE 2001; Trivedi 2005) carried out focused search/study for this species. Considering its low abundance reported so far, the species appears 'very rare' and patchily distributed even in suitable habitat.

Its estimated range of 62,700 km^2 (BirdLife International 2001) is disjunct and local patchiness of distribution coupled with increasing negative anthropogenic influences leave a low proportion of this as suitable habitat. At Jessore, thorn forest and thorn-scrub habitats where Pied Tit was sighted were under severe stress. Although clear trends are not available, Singh (2001) has shown a loss of about 30 km^2 of *Acacia* and *Zizyphus* forest to the exotic *Prosopis chilensis* in about three decades in the Kapasia area of the sanctuary. I recorded heavy biotic pressure in the form of cutting and lopping of *A. senegal*, *M. emarginatus* and *B. monosperma* trees for fuel and fodder, spread of the invasive exotic *P. chilensis*—leading to loss of its natural thorn-scrub habitat, as also shown by others (Khachar 1996; GEER & GUIDE 2001; Tiwari 2001), unregulated grazing of livestock, stone and marble quarrying, lack of awareness among enforcement staff, and clearing of land for agriculture. All these factors could have a long-term impact through the loss and alteration of suitable habitat.

Apart from its rarity, lack of sightings of immature birds and no evidence of breeding of Pied Tit during the present study possibly points to a lack of nesting activity in the area, nesting failure or local/regional movements for breeding. Besides, breeding by the species and presence of immature/young birds has been reported only by a handful of authors (Ali 1954–1955; GEER & GUIDE 2001; Hussain *et al*. 1992; Lott & Lott 1999). Nesting failure has been identified as a likely reason for the decline of Pied Tit by Hussain *et al*. (1992). Pied Tit is a secondary hole-nester and apparently depends on nest holes made by Yellow-crowned Woodpecker *Dendrocopos mahrattensis* for breeding (Tiwari & Rahmani 1997). The latter had a relative abundance of 0.0024, lower than that of Pied Tit itself at Jessore (Trivedi 2005). This could be a crucial limiting factor for potentially breeding Pied Tit. Natural cavities in trees are also used by Pied Tit for nesting. The tree species that develop such natural cavities at Jessore include *Acacia senegal, Butea monosperma, Maytenus emarginatus, Salvadora persica, S. oleoides, Bauhinia racemosa* and *Prosopis cineraria* (*personal observ.*). Suitable holes are generally present in old trees; however, in the exotic *P. chilensis* such cavities are rare, if not absent altogether (*personal observ.*). Cutting of large trees in the thorn-scrub habitats and spread of *P. chilensis* at Jessore is thus reducing the availability of potential nesting sites for the Pied Tit.

Conclusion

The endemism and constitutional rarity of Pied Tit coupled with its patchy distribution, low conservation priority as evidenced by its inclusion in Schedule IV of the Indian Wildlife (Protection) Act, 1972, lack of evidence for breeding at Jessore, low abundance of its nest-host—the Yellow-crowned Woodpecker, and rampant loss, degradation and fragmentation of its thorn forest and thorn-scrub habitats point towards a need to review the status of the species and assign a higher conservation priority to it at the national and global levels.

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