True winter distribution of the Forest Wagtail *Dendronanthus indicus* in India

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Kannan, R., Santharam, V., Kannan, A., & Nagarajan, V. M. 2018. True winter distribution of the Forest Wagtail *Dendronanthus indicus* in India. *Indian BIRDS* 14 (2): 33–36.

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Manuscript received on 12 October 2017.

The Forest Wagtail *Dendronanthus indicus* breeds in eastern Asia and winters in evergreen, and deciduous forests in parts of South- and Southeast Asia (Ali & Ripley 1987). In the Indian Subcontinent, it is widely reported to winter in south-western India, and pass through the rest of peninsular India on migration (see Table 1 below). Here we report, based on our records plus an analysis of eBird (eBird 2017) data, and museum specimen records, that the species winters in all of the southern part of the peninsula wherever there is suitable habitat, and not just the south-western portion of the peninsula—Kerala, and the Western Ghats. We define 'winter' as the period between southward- and northward-bound migrations—November through February—when the species is relatively sedentary (after Remsen 2001). Principal locations in the article are shown in Fig. 1.

Most of our records have not yet been uploaded into eBird (www.eBird.org). We compiled all our sight records of the Forest Wagtail (243 encounters), obtained over 39 years (1979–2017), from the Chennai (formerly, Madras) area. We found that the species occurred in all the months from August through May in this area (Fig. 2), and not just during its passage migration—typically September–October for south-bound, and March–April for north-bound migrants (Santharam 1980; Kannan 1985, 1987). We cannot attribute much relevance to the peaks in the number of sightings in October and March (Fig. 2) because these data were collected opportunistically during birding trips. We did not standardise the time we spent in the field, i.e., there may have been more sightings in some months simply because we spent more time birding in those months. Of significance is the striking temporal pattern of occurrence during August–May. Relative frequencies of occurrence are covered later in this paper.

We also used citizen science data available in the public domain on www.eBird.org (eBird 2017) to generate seasonal bar charts and distribution maps. We generated composite eBird bar charts for the Forest Wagtail from the Chennai and Bengaluru (formerly, Bangalore) areas (covered as 'counties' in eBird), which are on the eastern coast, and in the center of the peninsula, respectively, and compared them with an eBird bar chart from Kerala state, which is part of the south-western winter range of the species (Fig. 3). We did not include a bar chart for the state of Tamil Nadu because the western part of

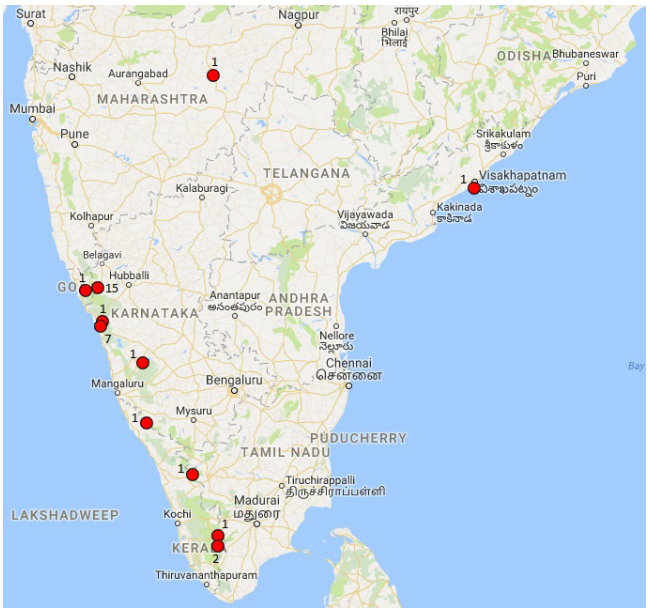

Fig. 1. Distribution of specimens of Forest Wagtails obtained from peninsular India. The number of specimens from each locality is indicated next to the red dots. The locality of two specimens from BNHS was labelled generically as 'Kerala' and hence, is omitted from this map. The map was generated using latitude–longitude coordinates via www.copypastemap.com

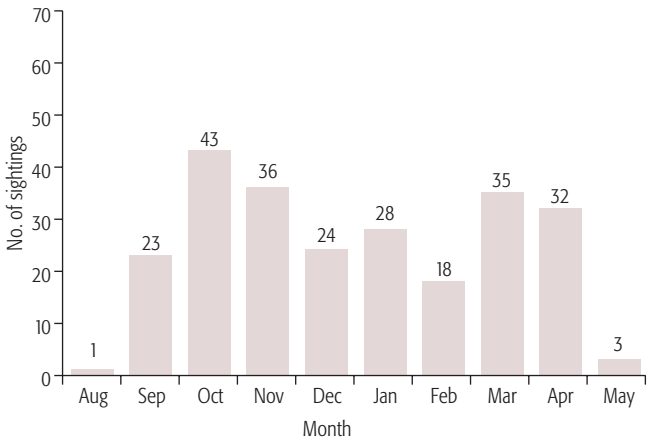

Fig. 2. Forest Wagtail sightings in the Chennai area (1979–2017). The numbers indicate number of encounters with the species, not individual numbers of birds

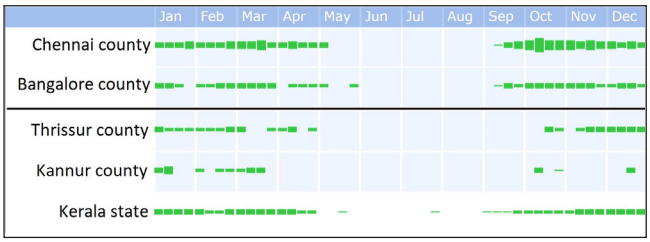

Fig. 3. Seasonal bar charts for the Forest Wagtail in two districts (counties) in east (top panel) and west (bottom panel) of peninsular India, including a bar chart for the state of Kerala overall. The higher green bars show the periods when a species is least likely to be missed, while the narrower green bars show when species is present (or sometimes present), but infrequently detected (eBird 2017). The first four rows from the top are based on a total of 5735, 14052, 10887, and 5391 submitted checklists. Composite image generated and compiled from eBird (www.ebird.org) and created August 13, 2017.

that state encompasses the Western Ghats, which is part of the species' reported winter range. Chennai and Bengaluru are in the currently accepted passage migration range of the species. The temporal patterns of occurrence of the species in Chennai, and Bengaluru, and in Kerala state were virtually identical; also, the temporal patterns in Chennai and Bengaluru were more uniform compared to the top two (defined by eBird as those with most checklist submissions) counties in Kerala (Fig. 3). This shows that the species winters in the eastern part of the peninsula, in addition to Kerala. The relative increase in sightings in Chennai, denoted by an increase of bar heights (Fig. 3), in October and March, may indicate southward- and northward-bound migratory waves, respectively. The relative lack of uniformity in the two Kerala counties may be due to the inclusion of coastal checklists that did not cover potential Forest Wagtail habitats. The gaps in the Kerala bar charts are discussed below.

In addition, we generated an eBird seasonal bar chart for the species from Guindy National Park (*hereinafter*, GNP) and the Indian Institute of Technology (*hereinafter*, IIT), which comprise an expanse of contiguous semi-evergreen scrub in Chennai, whence most of our sightings were made, and compared that to a combined bar chart for the top five Kerala hotspots (Fig. 4). Again, the pattern showed that the species' temporal distribution in Chennai was similar to that in Kerala. We combined data from the top five Kerala hotspots due to weak or inadequate data from any one of those areas. Also, we could not generate meaningful eBird bar charts from other areas of the eastern peninsula (the supposed passage migration area of the species) since there were insufficient data. The Bengaluru and Chennai areas were, in contrast, covered and reported adequately by birders, and thus we were able to generate meaningful temporal patterns. The frequency bars in Figs. 3 and 4 are stronger and more uniform

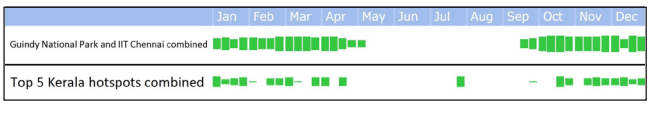

Fig. 4. Seasonal bar charts for the Forest Wagtail comparing two contiguous Chennai area hotspots (top panel) with the top five Kerala hotpots combined. The wider green bars show the periods when a species is least likely to be missed, while the narrower green bars show when species is present (or sometimes present), but infrequently detected (eBird 2017). The top and bottom panels are based on a total of 746 and 669 checklists, respectively. Composite image generated and compiled from eBird (www.ebird.org) and created on 13 August 2017. The Kerala hotspots covered are (in the order of most checklists): Thattekad Bird Sanctuary, Periyar Tiger Reserve Boat Landing, Thattekad Bird Sanctuary Urulanthanni, Walayar Reserve Forest, and Periyar Tiger Reserve.

in Chennai than in Kerala, which may indicate that suitable habitat in the eastern peninsula is patchy (and well-visited by Forest Wagtails and birders) compared to a more homogeneous spread in the moist southwestern areas. Our more recent records indicate that Forest Wagtails were observed in GNP in all of the five months from September 2016 to January 2017 (n = 27 trips).

We generated a distribution map of all winter sightings (November–February) of the species in the peninsula from eBird (Fig. 5). This clearly shows that the species is not restricted to the southwestern regions in winter, but is found elsewhere in the southern half of the peninsula wherever optimal habitat exists.

We downloaded eBird data for a closer look at the frequency of Forest Wagtail observations (percent of complete[1] eBird checklists that reported the species) in all the aforementioned areas, which is the basis of the bar charts discussed above. The frequency of encounters in Chennai and Bengaluru was noticeably higher than in Kerala state overall and in the top two counties in Kerala (Thrissur and Kannur; Fig. 6). Also, the combined frequency in GNP and IIT was also much higher than in the top five Kerala hotspots combined (Fig. 7). (As in the bar chart analysis, we had to combine the hotspots of Kerala because of inadequate data from any one of those. The addition of the next three Kerala hotspots [for a total of 8] did not change the bar chart. We could not use the top five hotspots from Tamil Nadu for comparison because they are all in the Western Ghats.) It is noteworthy that about half (eight-week mean 52.6%) of the 76 checklists from GNP/IIT in November/December, and about a third (eight-week mean 28.8%) of the 338 checklists from January/February, reported the species (Fig. 7). The data further reinforces our contention that there is a consistent presence

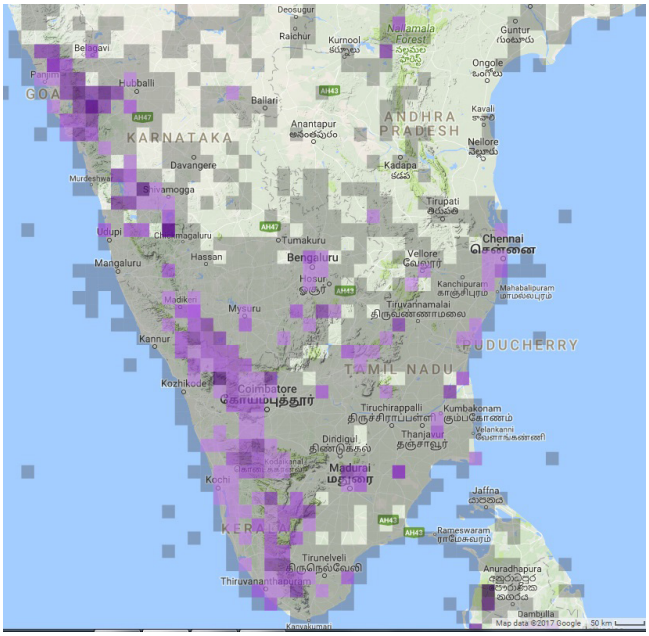

Fig. 5. eBird winter distribution of Forest Wagtail in peninsular India November through February (all years). Image provided by eBird (www.ebird.org) and created August 13, 2017.

[1] In eBird, a complete checklist is the list of birds that an observer saw, or heard, to the best of his/her abilities. It is a mechanism to obtain both, presence, and absence of a species during the sampling effort.

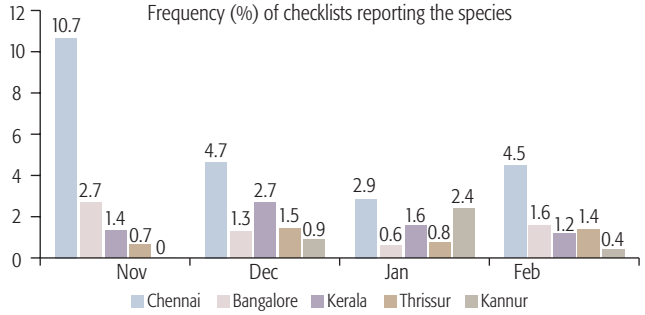

Fig. 6. Frequency (%) of eBird checklists reporting the Forest Wagtail in the districts (counties) of Chennai and Bangalore, compared with Kerala state overall, and the top two Kerala counties of Thrissur and Kannur.

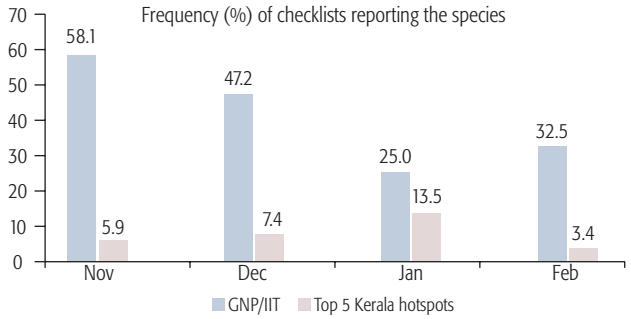

Fig. 7. Frequency (%) of eBird checklists reporting the Forest Wagtail in Guindy National Park and Indian Institute of Technology eBird hotspots in Chennai, compared with the top five Kerala hotspots combined.

of the species in the winter months in the eastern part of the peninsula, especially in the Chennai area.

In light of the overall evidence presented here, we can now confidently state that the Forest Wagtail winters not only in south-western India, but also in southern peninsular India wherever suitable habitat (groves and woods with sparse ground cover but dense canopy) occurs. Grewal *et al.* (2002) contains the only published map that reflects the true winter distribution. A review of the species' status is needed for Andhra Pradesh (*hereinafter*, AP), Telangana, and the Eastern Ghats, where it is supposed to winter (Ali 2002; Manakadan *et al.* 2011).

Interestingly, of the ten eBird-records from Pt. Calimere (on the eastern coast of India, and just off Sri Lanka), nine were recorded in September–October, suggesting a Sri Lanka-bound movement in that area. In contrast, all three eBird reports from the vicinities of Puducherry (formerly, Pondicherry), further north on the eastern coast, and all nine from the Madurai area further south, are from December–February—in the peak winter timeframe by our definition. One of the authors of this paper (VS) observed it once in September, six times in October, and twice in November in the Puducherry area, suggesting both, passage, and winter resident status. It is possible that this pattern is the same in most of the other wintering areas as well, with some winter residents and some southward- or northward-bound transients. More records from outside of Chennai and Bengaluru are needed for a clearer picture of its movements east of the Western Ghats.

Various factors could have contributed to the wide difference between the published historical records of this species, from our observations in this paper. The fact that Kerala has been traditionally well surveyed relative to other parts of the peninsula may have played a role. Kerala leads the nation even in the current eBird era: With 106,557 submitted checklists (as on 21 August 2017), it is followed, distantly, by Tamil Nadu in the number of submissions (58,389). Even extant museum records are mostly from the south-western part of the peninsula. We solicited museum records of Forest Wagtail specimens collected in India. Of the total of 59 specimen records we compiled, 34 were from the peninsula (south of 20 degrees latitude; Fig. 1), of which, only two (one from Visakhapatnam, AP, and the other from Amravati, Maharashtra) were from the eastern, or central part of the peninsula; an area through which, the bird supposedly passes. The fact that 94% of the specimens collected in the peninsula happened to be from the south-western region (an artifact of sampling) may have deceptively indicated the more restricted south-western range reported by many authors. As Remsen (2001) cautioned, specimen records are not always reliable to determine seasonal distribution. They are strongly biased toward more visited areas, and the absence of specimens from an area does not necessarily indicate that the species does not occur there.

Copycat error perpetuation (Remsen 2001), where authors simply repeat opinions presented by others without scouring the literature for contrasting claims, may also have played a role. A few sources that indicated a wider winter range were overlooked or ignored (Table 1). In the nineteenth century, Jerdon (1863: 227) wrote that the species '…is found throughout the whole peninsula of India…' More than a century later RK published unequivocally that the species is a 'common winter visitor in Madras' and even added that it 'can be seen practically every month till the subsequent summer' (Kannan 1985). Grewal *et al.* (2002) got the winter range map right, although they indicated that the species winters 'mainly' in south-western India. Manakadan *et al.* (2011) widened their portrayal of the winter

Table 1. Comments on the winter range of the Forest Wagtail in southern India from the literature, in chronological order

Winter range	Reference
'throughout the whole peninsula of India…rare in the South of India…'	Jerdon 1863
'…winter visitor to…the Western Ghats…'	Sanjeeva Raj 1960
'…are they staying back in Madras throughout the winter?'	Santharam 1980*
'common winter visitor in Madras…can be seen practically every month till the subsequent summer'	Kannan 1985
'Seen regularly in all winter months between September and May…It can now be conclusively established that it is a common, regular winter visitor [in Madras]'	Kannan 1987*
'southwestern India…western Tamil Nadu…'	Ali & Ripley 1987
Map shows that it winters in the Western Ghats, with a small isolated winter population in Chennai area.	Kazmierczak 2000
'Mostly winter visitor to Andhra Pradesh…disjunctly to the WG [Western Ghats] complex'	Ali 2002
'locally common winter visitor mainly to hills of…sw India' but map shows all of Western Ghats and southern peninsular India.	Grewal *et al.* 2002
'…E and W Ghats…'	Manakadan *et al.* 2011
'Mainly a winter visitor to…SW India…'	Grimmett *et al.*. 2012
'Winters primarily W Ghats…widely scattered passage records in Subcontinent…'	Rasmussen & Anderton 2012

*Not a publicly available source

range beyond Western Ghats, to (albeit erroneously?) include the Eastern Ghats. Despite these indications of a wider winter range, the most recent authoritative work on the avifauna of South Asia (Rasmussen & Anderton 2012) reported that the species winters in the Western Ghats and has 'widely scattered passage records' in the subcontinent. The last aforementioned work relied heavily on museum specimens and treated uncorroborated sight records with understandable cynicism (see Rasmussen 2005); but eBird has the potential to add more credibility to sight records, with the chorus of crowd-sourced reports, screened by vigilant eBird reviewers, drowning out or excising the incredible and unreliable ones.

Given the preponderance of reports that the species winters in the Western Ghats (Table 1), there may have been a mistaken assumption early on that the species is a rainforest or hill bird. We found no support in the literature for either of these suppositions. Ali (1979) does not even include the Forest Wagtail in his treatise, *Indian Hill Birds*. A survey of literature from neighboring countries indicates that the bird is neither partial to hills nor rainforests. In Sri Lanka, it winters in 'wooded areas throughout' (Harrison 1999); in Thailand, it occurs 'from plains to 1500m' (Lekagul & Round 1991); and in Southeast Asia, it occurs 'up to 5,000 feet', in 'forests, second growth, paddy fields' (King *et al.* 1983).

Though we find enough evidence in citizen science data in eBird to support our hypothesis, we do not dwell deep to understand the differences in reporting frequencies amongst the different regions. Hence, we caution our reader from interpreting more than what is essential from the charts we present. To cite two examples, the birding duration of the lists will have an influence on the frequency charts in eBird. A region with many shorter duration lists will inherently have a reduced reporting frequency for an uncommon species. Secondly, a region with more focused birding effort, restricted to key areas, will show higher reporting frequencies than a region with a more geographical spread in birding effort. Both these factors are applicable to Kerala, where they are running a bird atlas through eBird, covering the entire state with short, 15 min duration lists.

Our findings indicate that the true winter distributions of other Indian bird species, especially the purported 'mountain-top migrants' like Indian Blue Robin *Larvivora brunnea*, and Pied Thrush *Geokichla wardii* (Ali 1979), may also require similar revision and reassessment, as birding increases in popularity and as more birders enter their data on eBird. Photographic records of both the aforementioned species, from eastern Tamil Nadu, have been reported in eBird. VS suggested a similar revision of the wintering range of the Black Baza *Aviceda leuphotes*, which was supposedly a passage migrant on the eastern seaboard (Naoroji 2006), but is seen in small numbers in Chennai from October through March (Santharam 2009). A clear picture of bird distributions is vital for conservation efforts (Remsen 2001), especially in the face of possible future changes induced by climate change and other anthropogenic factors. More analysis of the kind we present in this article, and those conducted in the Neotropical regions by Marantz & Remsen (1991), and Remsen (2001), are required for Indian avifauna.

Acknowledgments

A citizen science initiative like eBird exists because of the citizens, the birders who upload their data. We thank all those contributors. Museum specimen records were obtained mostly via VertNet (www.VertNet.org) from the following museums: Bombay Natural History Society, Royal Ontario Museum, LSA Museum of Zoology University of Michigan, Natural History Museum Los Angeles County, Museum of Comparative Zoology Harvard University, National Museum of Natural History Smithsonian Institution, Royal Belgian Institute of Natural Sciences, The Field Museum, Yale Peabody Museum, American Museum of Natural History, University Museum of Zoology Cambridge, and the Natural History Museum University of Oslo. Tara Gandhi and Rahul Khot helped with the BNHS collection. Helen James and Christopher Milensky helped with the Smithsonian collection. To retrieve relevant literature we searched the online 'Bibliography of South Asian Ornithology' (Pittie 2017). The Molly Frances Jordan Memorial Endowment for Biology Research, plus a travel grant from the University of Arkansas–Fort Smith, assisted in the work. A detailed review by an anonymous reviewer helped improve the manuscript.

References

Ali, S., 1979. *Indian hill birds.* Delhi: Oxford University Press. Pp. i–lvi, 1–188.

Ali, S., 2002. *The book of Indian birds.* 13th (Revised) ed. Mumbai: Bombay Natural History Society & Oxford University Press. Pp. i–lvii, 1–326+7.

Ali, S., & Ripley, S. D., 1987. *Compact handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka.* 2nd ed. Delhi: Oxford University Press. Pp. i–xlii, 1 l., 1–737, 52 ll.

eBird. 2017. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: http://www.ebird.org. (Accessed: 22 August 2017).

Grewal, B., Harvey, B., & Pfister, O., 2002. *A photographic guide to the birds of India and the Indian Subcontinent, including Pakistan, Nepal, Bhutan, Bangladesh, Sri Lanka & the Maldives.* 1st ed. Singapore: Periplus Editions (HK) Ltd. Pp. 1–512.

Harrison, J., 1999. *A field guide to the birds of Sri Lanka.* 1st ed. Oxford, U.K: Oxford University Press. Pp. i–xiii, 1–219.

Jerdon, T. C., 1863. *The birds of India being a natural history of all the birds known to inhabit continental India: with descriptions of the species, genera, families, tribes, and orders, and a brief notice of such families as are not found in India, making it a manual of ornithology specially adapted for India.* 1st ed. Calcutta: Published by the author (Printed by The Military Orphan Press). Vol. II.-Part I of 2 vols. Pp. 1–439.

Kannan, R., 1985. Exodus of the Forest Wagtail from Madras. *Newsletter for Birdwatchers* 24 (11-12): 3–4.

Kannan, R., 1987. A study of the avifauna of Madras city and its environs. M.Sc. dissertation. Loyola College, Madras.

Kazmierczak, K., 2000. *A field guide to the birds of India, Sri Lanka, Pakistan, Nepal, Bhutan, Bangladesh and the Maldives.* 1st ed. New Delhi: Om Book Service. Pp. 1–352.

King, B., Woodcock, M., & Dickinson, E. C., 1983. *A field guide to birds of Southeast Asia*. Collins, London.

Lekagul, B., & Round, P. D., 1991. *A guide to the birds of Thailand*. Saha Karn Bhaet, Co. Ltd.

Manakadan, R., Daniel, J. C., & Bhopale, N., 2011. *Birds of the Indian Subcontinent: a field guide (based on Salim Ali & Dillon Ripley's 'Pictorial Guide').* 1st ed. Mumbai, India: Bombay Natural History Society & Oxford University Press. Pp. i–xii, 1–409+8+3.

Marantz, C. A., & Remsen, Jr., J. V., 1991. Seasonal distribution of the Slaty Elaenia (*Elaenia strepera*), a little-known austral migrant of South America. *Journal of Field Ornithology* 62: 162–172.

Naoroji, R., 2006. *Birds of prey of the Indian Subcontinent.* Reprint ed. New Delhi: Om Books International. Pp. 1–692.

Pittie, A., 2017. Bibliography of South Asian Ornithology. URL: http://www.southasiaornith.in. [Accessed on 22 August 2017.]

Raj, P. J. S., 1960. The Forest Wagtail, *Motacilla indica* (Gmelin), in Madras, Chingleput District. *Journal of the Bombay Natural History Society* 57 (1): 220–221.

Rasmussen, P. C., 2005. On producing *Birds of South Asia*. *Indian Birds* 1 (3): 50–56.

Rasmussen, P. C., & Anderton, J. C., 2012. *Birds of South Asia: the Ripley guide.* 2nd ed. Washington, D.C. and Barcelona: Smithsonian Institution and Lynx Edicions. 2 vols. Pp. 1–378; 1–683.

Remsen Jr., J. V., 2001. True winter range of the Veery (*Catharus fuscescens*): Lessons for determining winter ranges of species that winter in the tropics. *The Auk* 118 (4): 838–848.

Santharam, V., 1980. Forest Wagtails (*Motacilla indica*) in Madras on New Year Day. *Madras Naturalists' Society Bulletin* II (January).

Santharam, V., 2009. The Black Baza *Aviceda leuphotes* in Chennai: a review of sight records. *Indian Birds* 5 (1): 19–20.