Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

COMMUNICATION

THE RED-HEADED FALCON *FALCO CHICQUERA* DAUDIN, 1800 (AVES: FALCONIFORMES: FALCONIDAE) BREEDING ON PALMYRA PALM AT BAHOUR LAKE, PUDUCHERRY (PONDICHERRY), INDIA

Raveendran Lekshmi & Surendhar Boobalan

26 March 2018 | Vol. 10 | No. 3 | Pages: 11416-11422
10.11609/jott.3221.10.3.11416-11422

COMMUNICATION

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 March 2018 | 10(3): 11416–11422

ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

OPEN ACCESS

The Red-headed Falcon *Falco chicquera* Daudin, 1800 (Aves: Falconiformes: Falconidae) breeding on Palmyra Palm at Bahour Lake, Puducherry (Pondicherry), India

Raveendran Lekshmi [1] **& Surendhar Boobalan** [2]

[1] Department of Ecology and Environmental Sciences, Pondicherry University, Kalapet, Puducherry 605014, India
[2] No. 18, Perumal Koil Street, Alankuppam, Puducherry 605111, India
[1] lekshmises@gmail.com (corresponding author), [2] sureboo@gmail.com

Abstract: Breeding of the Red-headed Falcon *Falco chicquera* is being reported from Bahour Lake in Union Territory of Puducherry along with the breeding period observations. The falcon nesting on the Palmyra palm *Borassus flabellifer* is reported for the first time from the country. The courtship was observed in mid-January and chicks fledged in mid-April. Incubation lasted 37 days, chicks fledged in 34–37 days, become nest independent in 40–43 days and become independent from parental care in 69–72 days. Feeding frequency for 27–30 days old chicks were five prey deliveries during a two hours' observation in the morning. Fledglings were adult size, but with brownish crown and moustachial stripe, pale collar, maroon shoulders, darker wings and buff tinge on the underside; and were observed to retain the foraging territory in nesting area even after one month of removal from parental care. Availability of quality crow nest in areas of good prey density could be a decisive factor in selecting breeding location; many crow nests on Palmyra palms were noticed in Puducherry region. The palm nesting falcon could face additional threats from toddy and fruit extractors since the breeding season coincides with the flowering and fruiting season of Palmyra.

Keywords: Breeding, East Coast, *Falco chicquera*, Palmyra palm Puducherry, Red-headed Falcon.

DOI: http://doi.org/10.11609/jott.3221.10.3.11416-11422

Editor: Rajiv S. Kalsi, M.L.N. College, Yamuna Nagar, Haryana, India.

Date of publication: 26 March 2018 (online & print)

Manuscript details: Ms # 3221 | Received 18 September 2017 | Final received 20 January 2018 | Finally accepted 31 January 2018

Citation: Lekshmi, R. & S. Boobalan (2018). The Red-headed Falcon *Falco chicquera* Daudin, 1800 (Aves: Falconiformes: Falconidae) breeding on Palmyra Palm at Bahour Lake, Puducherry (Pondicherry), India. *Journal of Threatened Taxa* 10(3): 11416–11422; http://doi.org/10.11609/jott.3221.10.3.11416-11422

Funding: Self-funded.

Competing interests: The authors declare no competing interests.

Author Details: R. Lekshmi has done a masters in Environmental Science and Management at Mahatma Gandhi University, Kerala and is currently pursuing a PhD at Pondicherry University in Ecology and Environmental Sciences. Surendhar Boobalan is a Primary School Teacher at Government Primary School, Indira Nagar, Puducherry who is also an avid birder.

Author Contribution: The breeding pair of Red-headed Falcons was first sighted and field study was conducted by SB. RL prepared the manuscript and compiled the data.

INTRODUCTION

The Red-headed Falcon *Falco chicquera* (RHF) is usually encountered in the drier and open habitats of the plains with sparse vegetation, arable fields and near human habitation, from open country to cities (Baker & Inglis 1930; Subramanya 1980, 1982; Kazmierczak 2000; Ali 2002; Naoroji 2006; Foysal 2010; Naoroji 2011). It is a resident falcon, although local movements occur in northeastern and southwestern India (Naoroji 2006; Praveen & Sankar 2010). Until recently, this Asian falcon was considered to be conspecific with the Red-necked Falcon (RNF) occurring in Africa, the *F. ruficollis* (del Hoyo et al. 2014; BirdLife International 2016).

The falcon is reported throughout India in checklists and eBird (2016); there are many historic collection records. Breeding and continued presence have been reported from Gujarat (Dharmakumarsinhji 1955; Tiwari 2000; Naoroji 2006, 2011), Rajasthan (Barnes 1886), Pune (Dharap 1974; Gole 1980; Ingalhallikar 1988) and Bangalore (Baker et al. 1930; Govindakrishnan et al. 1978; Subramanya 1980, 1982, 1985). The falcon is considered to be rare in West Bengal, the North-east and South-west with records from Assam, Cachar and Manipur (Inglis 1899; Ali 2002; Naoroji 2006) and scattered records across Kerala (Neelakantan 1960; Zacharias & Gaston 1993; Sugathan & Varghese 1996; Praveen & Sankar 2010). In Tamilnadu, it was reported from Chennai (Dewar 1905), Madurai (Nichols 1944), Mettupalayam (Ramkumar & Karthick 2005), Point Calimere (Sugathan 1982) and Tirunelveli (Webb-Peploe 1945). RHF seems to thrive well in and around Chennai located 140km north of Puducherry, where it is reported from at least 20 different locations on eBird (2016). Between 2012 and 2016, nine birds along with nesting were sighted at Chennai (Karthik Ramamurthy pers. comm. 2016). Three birds were sighted between Chennai and Puducherry at Kaliveli wetland and Dindivanam (Lekshmi Raveendran pers. obs. 2016).

RHF has become Near Threatened due to a rapid decline throughout its home range in South Asia and habitat fragmentation (BirdLife International 2014). The falcon is reported to have low fecundity, low survival rate and high pesticide contamination of eggs; proportion of infertile eggs is estimated to be 14–27 % and a fledging rate of 1.44 chicks per nest (Osborne 1981; Olwagen & Olwagen 1984; Bednarek 1987). The falcon is selective in choosing a mate and nest site. Pair-bonding is much delayed among wild-caught birds in captive breeding experiments (Olwagen & Olwagen 1984; Bednarek 1987). It prefers to breed in the vicinity of humans and usually occupies an old raptor or crow nest rather than building a nest on its own (Dharap 1977; Subramanya 1982; Ali 2002; Naoroji 2006, 2011). In addition to trees, nesting on artificial structures like electricity pylons (Foysal 2015), city towers (Gole 1980) and water tank (Foysal 2010) are also reported.

Extensive studies on its in situ breeding behaviour, nesting cycle, diet, parental roles and ecology were done by Subramanya (1982), Foysal (2010), Naoroji (2011) and Foysal (2015) and in Africa that of RNF by Osborne (1981). The ex situ (captive) breeding aspects of RHF were studied by Bednarek (1987) and that of RNF by Olwagen & Olwagen (1984). The breeding of RHF is hitherto reported for the first time from the Union Territory of Puducherry (erstwhile Pondicherry), at Bahour Lake along with observations on its breeding cycle which will add more information to the current knowledge on the breeding biology of the species.

STUDY AREA

Puducherry is located on the east coast of southern India in Union Territory of Puducherry as enclaves within the Tamil Nadu plains. The climate is coastal sub-arid and vegetation is dominated by thorny scrub jungle, Acacia and Palmyra palms. The major rainy season is the northeast monsoon occassionally accompanied by cyclones. The region has numerous constructed tanks for water storage since the soil is coastal alluvium and red soil high in clay content (Bureau of Statistics & Evaluation 1976). Bahour Lake is an interstate freshwater tank of 600ha located mostly in Puducherry and is part of a poorly drained coastal flood plain in the catchment of Pennaiyar River (Bureau of Statistics & Evaluation 1976). The main source of water to the Lake is run off and flood water released to the river from Sathanar Dam located 105km upstream.

Bahour Lake may reach >1m depth towards the year end and dries up almost completely between May and September leaving only a narrow channel along its boundaries. The water depth and duration of dry months depends on the duration and strength of consecutive northeast monsoons. While drying up, the lake transforms itself into a variety of swampy, marshy and grassland habitats that support abundant waterfowl populations. It has been recognized as an Important Bird Area that can support more than 20,000 birds every year but lacks official protection (Islam & Rahmani 2004).

There are paddyfields on either side of the lake and its Puducherry side is less inhabited. The bund along this

side is lined with large trees soon giving way to Palmyra Palms. The nest under study was located on a tall palm (>25m) on the lake embankment in the immediate vicinity of scattered households belonging to Nirnayapet Village; the villagers regularly visit the falcon nesting area for crossing over, defecation and toddy extraction.

Method

Regular weekly observations of 30 minutes to two hours depending on the breeding stage throughout the breeding period (January–June 2016) were made from the terrace of a nearby house (shorter observations during pre-incubation,incubation stages and longer observations during other stages).

Table 1. Summary of breeding observations

Event	Date	Duration/ observations
Breeding pair sighting	15.i.2016	Food transfer at nest, nest defence
Pre-incubation nest occupancy	15.i.2016–27.i.2016	Courtship, laying
Mating	24.i.2016	Recopulation
Incubation	28.i.2016–04.iii.2016	37 days
Hatching	05.iii.2016–08.iii.2016	4 days
Brooding	08.iii.2016–25.iii.2016	18 days
Fledging	10.iv.2016	34–37 days
Nest independency	16.iv.2016	40–43 days
Independency from parental care	14.v.2016	69–72 days

RESULTS AND DISCUSSION

The RHF was first sighted at Bahour Lake of Puducherry in April 2014. On 18 January 2015, a pair was sighted on a Palmyra Palm *Borassus fabellifer* having an old nest and breeding was discovered on 15 January 2016 on a palm located diagonally opposite to it.

Breeding period observations

Breeding period observations are summarized in Table 1. The nest was a platform of twigs positioned between the base of the Palm leaf stalks. The female was found sitting in the nest plucking the prey that the male had delivered (Image 1); the male was positioned on the look-out palm, guarding the nest. There was no continuous nest occupation by female, so the pair was presumed to be in the courtship stage as suggested by Foysal (2010, 2015).

Female-solicited mating was observed after 10 days on the perch palm located diagonally opposite to the nest (Image 2). The day was overcast, with morning mist and intermittent rains. In falcons, multiple copulations through out the fertile window is common and especially in RHF, copulation starts 16-18 days before laying and lasts through out laying period (Olwagen & Olwagen 1984; Bednarek 1987; Sodhi 1991; Villarroel et al. 1998). The male falcon though aggressive to crows and rollers approaching the nest, both opportunistic predators, was tolerant of human presence. In RHF and RNF, the normal adult clutch size is 3–4 eggs laid at an interval of 1–3 days and incubation would begin on laying the third or last egg (Osborne 1981; Bednarek 1987). On 26 January, the female started to occupy the nest continuously, but it was prone to easy distraction and often got up in the nest. Proper incubation was recorded from 28 January. Throughout the incubation period the bird was passive to the observer and other disturbances. During tight brooding in the first fortnight of March, the female was uneasy of observer's approach and shifted position in nest warily, unlike during the incubation period. It had blood stained bill and the nest was festooned with soft white feathers like cotton shreds. When the chicks reached 19–22 days old, the female parent left the chicks for longer periods, exercised and nest guarded on the perch palm and participated in co-operative hunting. There were short periods of absence of the female from the nest during incubation and post hatching when the eggs and chicks were exposed to opportunistic predators, mainly to crows. Both the male and female were involved in defensive chases and contact against approaching crows.

Nestling development

On 26 March, three new hatchlings were detected at the nest when the female left to join the male on the perch tree; two of which stood up could be observed properly. The chicks were clothed in white downy feathers except for some juvenile feathers sprouting on wings, head and front (Image 3). One of the chicks had almost white (downy) head and wing, which could have been a late hatcher. They were estimated to be 19–22 days old following the plumage description of RHF chicks by Osborne (1981), Olwagen & Olwagen (1984) and Naoroji (2006), thus bringing the hatching date to around 5 March. This gives a longer incubation period of 37 days. In captivity RHF was found to have an average 35 days incubation period which prolonged to 39 days when initial humidity was high under artificial temperature, humidity and photoperiods (Bednarek 1987). Foysal (2015) has reported a shorter duration of

Image 1. Female feeding on transferred prey at nest

Image 2. Female-solicited re-copulation during its nest occupancy

Image 3. 19–22 days old chick; feathers sprouting on head, breast and wings

28 days from Bangladesh which is the only incubation period reported from the wild.

On 03 April, only two 27–30 days old nestlings with complete juvenile plumage (brown head and buff underparts including throat and meagre traces of down) were present at the nest; the third one had been lost. Both survived chicks fledged synchronously on 10 April when they were 34–37 days old and became nest independent when they were 40–43 days old. The 34–37 days old fledglings were of adult falcon size and resembled them closely with the exceptions of having brownish crown and moustachial stripe, pale rufous collar, darker wings, maroon shoulders and buff tinged underparts (Image 4). Both were of different sizes despite their similar appearance and were presumed to be of different sexes. Maiden flight was attempted to the perch palm and both later made a few short trips to the nearest palms of less than 50m in the vicinity, always accompanied by parent(s). During these trial flights, a juvenile was attacked twice by Large-billed Crow despite the ferocious counter-chases and defenses by the parents. After this incident, all falcons spent a lot of time of inactivity under a thick crowned Palmyra palm. On 16 April, one of the parents but no juvenile (now 40–43 days old) was sighted in the area, which was also the last sighting of the adult.

Complete independence (from parental care) and independent hunting was observed on May 14, 35 days post fledging, when they were found hunting as a pair at the lake (69–72 days old). They tried to catch a White-throated Kingfisher in flight, but missed it. Between 25 May and 18 June, none of the falcons were sighted. The nest tree had fruited by then and nest had visibly thinned into a few sticks. A juvenile RHF was found on 19 June, now 100–103 days old (3 months old), on a dead Acacia tree projecting from the middle of the lake and could have become as efficient a hunter as the parent (Image 6). By this time, the underside plumage had almost lost the buff tinge and had become predominantly whitish. The juvenile established its initial territory near the nest site even after 100 days of fledging, as observed by Foysal (2015). The sighting of a subadult RHF in juvenile plumage (brown head, pale collar, maroon shoulder, blunt wings) at Kaliveli wetland near Puducherry in August suggests that juvenile plumage may persist for a few months after becoming independent (in May–June), as suggested by Osborne (1981).

Feeding behaviour

The nest was observed for two hours from 06.15–8.15 hr for the feeding behaviour of the 27–30 days old nestlings. The female had moved to the perch palm for nest guarding and preening while the male went out hunting. The male had four successful hunts and the pair hunted together once. Once or twice the male

Image 4. 27–30 days old nestling with traces of down and buff tinged underparts

Image 5. Red-headed Falcon feeding thoroughly plucked kill to 27–30 days old nestlings

Image 6. 100–103 days old juvenile with whitish underparts

returned with prey in about a minute. Male brought the kill to the perch tree and plucked, where it was accepted by the female which it fed to the juvenile falcons back at the nest (Image 5). Feeding frequency was five times in two hours or 1.25/chick/hour. Prolonged feeding of chicks for 4–5 minutes was observed. In Gujarat, a longer nestling period of 48 days and nest-dependency period of 55 days has been observed (Naoroji 2011). It is possible that the nestling period is influenced by food intake since the feeding frequency studied in Gujarat was 0.48/hour/chick in 25–31 days old chicks, lower than the feeding frequency reported by Foysal (2015) of 0.8/hour/chick for 25–32 days old chick and that observed during present study of 1.25/hour/chick in 27–30 day old chick with an average of eight foraging hours/day (Naoroji 2011), though the observed feeding frequency need more set of observations to be conclusive.

Breeding site fidelity

The falcon has been a breeding site fidel at Bahour Lake since it was sighted during all breeding periods between 2014 and 2017. Similar site fidelity has been reported by other studies (Subramanya 1982, 1985; Foysal 2010; Naoroji 2011; Foysal 2015). The observed breeding periods (January-June) corresponds to the general breeding period reported for the subcontinent (Baker & Inglis 1930; Subramanya 1982; Ali 2002; Naoroji 2006; Foysal 2010, 2015). Naoroji (2006, 2011) reported a late onset of breeding and fledging in RHF under drought conditions. Late breeding of RHF at Bahour Lake with fledging in June was observed in 2017 when drought conditions prevailed due to total failure of the preceding north-east monsoon.

Palmyra palm as a nesting choice

RHF breeding on Palmyra palm is previously unreported in India and the falcon is regarded as unspecialised in its nesting choice (Naoroji 2011). At Bahour, however, it seems to have a marked preference for the Palmyra Palm since the lake itself also had plenty of lofty-crowned trees with abandoned crow and Shikra nests. Preference for Palmyra palms for breeding by RHF has been noted in Bangladesh (Foysal 2010) and in Africa for RNF (Osborne 1981). In 2017 also, the Falcon preferred to breed on a Palmyra palm near a heavily populated settlement at Bahour.

No nest building activity has been noticed in any of the years. The present nest, in all possibility, was a crow nest. Many crow nests were spotted on Palmyra palms through out Puducherry bioregion including Bahour during July–November 2016; in Kaliveli wetland

alone more than 30 and at Bahour Falcon breeding site, three new Crow nests were sighted during the period. Incidentally, sightings of an adult and a sub-adult RHF at Kaliveli wetland located 40km from Bahour during the period were both near to crow nests (one on an electricity pole and another on a Palmyra Palm). These observations suggest that in Puducherry region, RHF does have a preference for crow nests on tall palms located in sites of good prey availability.

At Bahour the location of the current nest palm is also an ideal hunt location. The tall palm has on its one side open water, marshland and grassland, the extent of which vary among months since Bahour Lake tends to dry up in summer. On its otherside there are paddy fields and thorny Acacia and shrub hedges. These habitats support a large number of prey like small wetland birds and woodland birds. In addition, the palm tree can serve as an ideal outpost with a 360^0 visibility for fast locating and tracking prey and predators while the thick crown of the palm effectively hides the nest and the falcon. It is also evident from the feeding data that the falcon hunts a large number of prey items during breeding (Osborne 1981; Bednarek 1987; Naoroji 2011; Foysal 2015) which necessitates, in the breeding season, a correspondingly large foraging territory with good prey density or a quality foraging site with good prey abundance. Bahour Lake remained flooded to its full expanse upto mid March 2016 and then started to dry up creating different potential waterfowl habitats. The nestling and fledgling stages of RHF coincided with return migration of waders *Charadrius* spp., abundance of Baya Weaver *Ploceus philippinus* and congregation of resident waterfowl with fledglings, especially of Rallids and Pheasant-tailed Jacana *Hydrophasianus chirurgus*. Pied Cuckoo *Clamator jacobinus*, Flycatchers *Muscicapa* spp. & *Terpsiphone paradisi*, Yellow Wagtail *Motacilla flava* and Reed Warblers *Acrocephalus* spp. were abundant in the first half of breeding season while Paddyfield Pipit *Anthus rufulus*, Oriental Skylark *Alauda gulgula*, Jerdon's Bushlark *Mirafra affinis*, Red-wattled Lapwing *Vanellus indicus*, Common Woodshrike *Tephrodornis pondicerianus*, White-browed Bulbul *Pycnonotus luteolus*, Red-vented Bulbul *Pycnonotus cafer*, Yellow Billed Babbler, Common Iora *Aegithina tiphia*, Indian Oriole *Oriolus kundoo*, Common Myna Acridotheres tristris, Indian Robin *Saxicoloides fulicata*, Magpie Robin *Copsychus saularis*, Spotted Dove *Streptopilia chinensis*, Eurasian Collared Dove *Streptopelia decaocto*, and Red Collared Dove *Streptopelia tranquebarica* were available throughout the breeding season. The primary preference of the falcon in breeding location selection however seems to be availability of a well-built crow nest along with quick prey options, which could be the reason of it ending up breeding in human vicinity (since crows live associated with humans).

Nesting on palm trees in the vicinity of humans has its own risks. It was noted that a few of the palms of the nest site had neatly trimmed crowns by May; a few palms had immature or remaining fruits post-harvest and pots inserted for toddy extraction. On interacting with villagers, we were conveyed that March–June is toddy and fruit extraction season, when the toddy/fruit extractors may also trim the crown for Palm leaves. The toddy extractors would destroy any nests present (even with eggs or chicks) during insertion of pot in order to escape from the attack of parent birds while retrieving the pots. This also make them vulnerable to collection for pet trade, for which birds of prey have a good demand. Luckily the current nesting tree fruited late compared to other palms in the vicinity, in June only, by the time juveniles have become completely nest independent, protecting the nestlings from the threat of fruit harvesting. Rarely raptor nests are also sought after by folks performing black magic. These seem to be additional threats for breeding success of palm nesting RHF, which already has impoverished fecundity and a prolonged breeding period.

CONCLUSIONS

The results indicate that the breeding location of RHF is more-or-less consistent over the years and occur near human habitation since it prefers to occupy well-built crow nests that can regularly meet a corresponding high prey demand during the breeding season. In the study area, Palmyra Palms are abundant and found to be preferred by crows for nesting and inturn, by the falcon. Though Palmyra Palms provide good cover, hunt location and 360^0 visibility, it could also bring the risks of toddy and fruit extraction. The effect of landuse, weather changes, pesticides, prey composition and its distribution on the breeding of RHF need to be further investigated to understand the population dynamics of this falcon and for bringing out a comprehensive conservation action plan for the species.

REFERENCES

Ali, S. (2002). The Book of Indian Birds. Daniel, J.C. (ed). Bombay Natural History Society, India, 121pp.

Baker, H.R. & C.M. Inglis (1930). *The Birds of southern India including*

Madras, Malabar, Travancore, Cochin, Coorg and Mysore. Government Press, Madras, India pp.i–xiii+1–504pp.

Barnes, H.E. (1886). Birds' nesting in Rajpootana. *Journal of the Bombay Natural History Society* 1(2): 38–62.

Bednarek, W. (1987). Breeding Red-headed Merlin *Falco chicquera chicquera* in captivity, pp. 51–62. In: Breeding and Management in Birds of Prey. Proceedings of the conference held at University of Bristol, UK, i–viii+1-187pp.

BirdLife International (2014.) *Falco chicquera*. In: IUCN 2016.The IUCN Red List of Threatened Species 2014: e.T22727778A40810376. http://doi.org/10.2305/IUCN.UK.2014-2.RLTS.T22727778A40810376.en Downloaded on 21 September 2016.

BirdLife International (2016). Species factsheet: Falco *chicquera*. http://www.birdlife.org/datazone/species/factsheet/22727778 Electronic version accessed on 21/09/2016

Bureau of Statistics and Evaluation (1976). Statstical Atlas of the Union Territory of Pondicherry Comprising of Pondicherry, Karaikal, Mahe & Yanam regions. Government of Pondicherry, Photo-Zinco Press, Madras, India, 1–39pp.

del Hoyo, J., N.J. Collar, D.A. Christie, A. Elliott & L.D.C. Fishpool (2014). *HBW and BirdLife International Illustrated Checklist of the Birds of the World - Vol. 1*. Lynx Edicions,Barcelona, Spain & BirdLife International, Cambridge,UK, 900pp.

Dewar, D. (1905). A list of the birds found in and about Madras. *Journal of the Bombay Natural History Society* 16(3): 484–498.

Dharap, R.N. (1977). Red-headed Merlins nesting in densely populated area. *Newsletter for Birdwatchers* 17(10): 11–12.

Dharmakumarsinhji, R.S. (1955). *Birds of Saurashtra, India: With additional notes on the birds of Kutch and Gujarat*. Published by Author, Calcutta, i–liii+1–561pp.

eBird (2016). Species Maps. http://ebird.org/ebird/map/ Electronic version accessed on 21 September 2016

Foysal, M. (2010). Study of the breeding behaviour of Red-necked Falcon *Falco chicquera* around Dhaka, Bangladesh. *BirdingASIA* 13(2010): 64–67.

Foysal, M. (2015). Observations of Red-headed Falcon *Falco chicquera* (Aves: Falconiformes: Falconidae) nest at Keraniganj, Dhaka, Bangladesh, with a focus on post-fledging behavior. *Journal of Threatened Taxa* 7(5): 7138–7145; http://doi.org/10.11609/JoTT.o3895.7138-45

Gole, P. (1980). A March bird count in Poona. *Journal of the Bombay Natural History Society* 77(1): 49–55.

Govindakrishnan, P.M., A. Verghese & A.K. Chakravarthy (1978). Occurrence of the Red-headed Merlin (*Falco chicquera* Daudin) in Bangalore, Karnataka. *Journal of the Bombay Natural History Society* 75(2): 487

Ingalhallikar, S. (1988). Birds of Prey of Pune. *Journal of Ecological Society* 1: 59–65.

Inglis,C. M. (1899). Birds collected during five years' residence in the Hylakandi District of Cachar, Part VI. *Journal of the Bombay Natural History Society* 12(2): 286–291.

Islam, Z. & A.R. Rahmani (2004). *Important Bird Areas in India: Priority Sites for Conservation*. Bombay Natural History Society, Birdlife International, Royal Society for the Protection of Birds & Oxford University Press, 833–837pp.

Naoroji, R. (2006). *Birds of Prey of the Indian Subcontinent*. Om Books International, Uttar Pradesh, India, 564–571pp.

Naoroji, R. (2011). Breeding of the Red-headed Falcon *Falco chicquera* in Saurashtra, Gujarat, India. *Forktail* 27(2011): 1–6.

Neelakantan, K.K. (1960). On the occurrence of the Red-headed Merlin (*Falco chiquera*) in Kerala. *Journal of the Bombay Natural History Society* 57(2): 409–411.

Nichols, E.G. (1944). Occurrence of birds in Madura District, Part II. *Journal of the Bombay Natural History Society* 44(4): 574–584.

Osborne, T.O. (1981). Ecology of The Red-Necked Falcon *Falco Chicquera* In Zambia. *Ibis* 123(3): 289–297.

Olwagen, C.D. & K. Olwagen (1984). Propagation of captive Red-necked Falcons *Falco chicquera*. *Koedoe* 27(1): 45–59.

Praveen, E.S. & A.G. Sankar (2010). Recent sightings of Red-headed Falcon *Falco chicquera* from Kerala. *Malabar Trogon* 8(2&3): 11–12.

Ramkumar, R. & M.G. Karthick (2005). Bird conservation and biodiversity in Forest College, Mettupalayam, pp. 6–8 In: New initiatives for bird conservation: Student supplement. INCERT & Newsletter for Birdwatchers, Bangalore.

Sodhi, N. (1991). Pair copulations, extra-pair copulations, and intraspecific nest intrusions in Merlin. *The Condor* 93(2): 433–437.

Subramanya, S. (1980). Redheaded Merlin *Falco chicquera*. *Newsletter for Birdwatchers* 20(2): 3–5.

Subramanya, S. (1982). Nesting of Redheaded Merlin (*Falco chicquera* Daudin) in Bangalore, Karnataka. *Journal of the Bombay Natural History Society* 79(2): 412–413.

Subramanya, S. (1985). Hunting and feeding habits of the Redheaded Merlin *Falco chicquera*. *Newsletter for Birdwatchers* 25(1-2): 4–8.

Sugathan, R. (1982). Some interesting aspects of the avifauna of the Point Calimere Sanctuary, Thanjavur District, Tamil Nadu. *Journal of the Bombay Natural History Society* 79(3): 567–575.

Sugathan, R. & A.P. Varghese (1996). A review of the birds of Thattakad Bird Sanctuary, Kerala. *Journal of the Bombay Natural History Society* 93(3): 487–506.

Tiwari, J.K. (2000). Redheaded Falcon sightings in Kutch. *Newsletter for Birdwatchers* 40(3): 37–38.

Villarroel, M., D.M. Bird & U. Kuhnlein (1998). Copulatory behaviour and paternity in the American Kestrel: the adaptive significance of frequent copulations. *Animal Behaviour* 56(2): 289-299; http://doi.org/10.1006/anbe.1998.0788

Webb-Peploe, C.G. (1945). Notes on a few birds from the South of the Tinnevelly District. *Journal of the Bombay Natural History Society* 45(3): 425–426.

Zacharias, V.J. & A.J. Gaston (1993). The birds of Wynaad, southern India. *Forktail* 8: 11–23.

Journal of Threatened Taxa

www.threatenedtaxa.org

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

March 2018 | Vol. 10 | No. 3 | Pages: 11361–11494
Date of Publication: 26 March 2018 (Online & Print)
DOI: 10.11609/jott.2018.10.3.11361-11494