10.11609/jott.2024.16.3.24819-25018 www.threatenedtaxa.org

> 26 March 2024 (Online & Print) 16(3): 24819-25018 ISSN 0974-79t07 (Online) ISSN 0974-7893 (Print)



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Cover: The breathtakingly beautiful SIlver Jubilee cover of JoTT is done in color pencils and ink by the 13-year old darling, Elakshi Mahika Molur. _____

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 March 2024 | 16(3): 24967-24972

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

https://doi.org/10.11609/jott.8574.16.3.24967-24972

#8574 | Received 06 June 2023 | Final received 10 January 2024 | Finally accepted 25 February 2024

D'Ering Memorial Wildlife Sanctuary, a significant flyway and a preferred stopover (refuelling) site during the return migration of the Amur Falcon *Falco amurensis* (Radde, 1863)

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Abstract: This communication reports the repeated sighting records of the Amur Falcon *Falco amurensis* with photographic evidence in the D'Ering Memorial Wildlife Sanctuary (DEMWS) of Arunachal Pradesh during the summer. Though there are many sighting reports of the Amur Falcon from many places in India, all are onward journeys (October and November). Hence, not only the repeated sighting of the Amur Falcon but also its sighting during the month of May in DEMWS is the record of its kind. This is significant information for ornithologists, as the recent sighting in the sanctuary is the second record of this raptor during the summer in the state, which also demonstrated that DEMWS is a significant flyway and a preferred stopover or refuelling site during the return migration of this raptor towards their breeding grounds.

Keywords: Arunachal Pradesh, breeding ground, DEMWS, East Siang, Longding, Niausa, northeastern India, Pasighat, raptors, transequatorial migrant

Adi abstract: Si lukan lutom namsí kapang yarnam Pémí Píong *Falcon amurensis* ém lobo todí lo Bomong kíbung Gíté lok Daying Ering me Mípangpe Simon-sili Dumsukeng (DEMSD) lo mimang kíng saki pe latbom dola lukan binam é. India solo sim Pémí Píong sim kapang ém lukan namé deddiné idokom takam si déngun ko mílí eke (Yite delokke Disang polo). Delok legape Pemí Píong em kapang yarnam petom mang, delok leko-leko pe Lukíng polo lo DEMSD lo kapang namsi atíkon pe ina donggenyana kope idung. Pettang mikín legape si kenyek rupe kengap penam kope idung, legang de Dumsukeng solok kapang tunam petom si Gítekone solo Pemí sok lobo todí lok donggen kope idung, si seke pekom lengkan bidung DEMSD si gairuna pettang détak ko delokke si biakgé-biakkur na Pemí kídí solok apí píko gídang pe biaklat sidak kuem mibang runam nottí kope lang dengge nana alang píten silíkko motet kope idung.

Editor: Anonymity requested.

Date of publication: 26 March 2024 (online & print)

OPEN ACCESS

(cc)

(i)

Citation: Tamir, T., A.T. Kimsing & D. Mize (2024). D'Ering Memorial Wildlife Sanctuary, a significant flyway and a preferred stopover (refuelling) site during the return migration of the Amur Falcon Falco amurensis (Radde, 1863). Journal of Threatened Taxa 16(3): 24967–24972. https://doi.org/10.11609/jott.8574.16.3.24967-24972

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Funding: Rajiv Gandhi University, Rono Hills Doimukh, Arunachal Pradesh-791112.

Competing interests: The authors declare no competing interests.

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Author contributions: TT did the field survey, data collection, and manuscript preparation. AKT managed the preparation of maps using GIS and GBIF data, while DM supervised the data analysis and provided important inputs for the study. All three authors contributed to the writing of the manuscript.

Acknowledgements: We thank the director and PCCF Arunachal Pradesh for all the necessary permission and Shri Tasang Taga, DFO DEMWS, for providing the necessary facility to carry out this work. We also thank the dean and head of the Department of Zoology at Rajiv Gandhi University for giving us station leave permission during the field study for this research work. Special thanks to Mr. Tameng Noram for the corrections and proofreading of the Adi abstract.



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INTRODUCTION

The Amur Falcon Falco amurensis, also known as the Eastern Red-Footed Falcon, is a sexually dimorphic small bird of prey in the family Falconidae of the order Falconiformes. The species has a red to pale orange cere, eye ring, legs, and feet in all plumages, with an overall size of 28-31 cm from bill to tail. The males are dark grey with rufous thighs and undertail coverts and white underwing coverts. Typical features of females include dark grey upperparts, a short moustachial stripe, whitish underparts with dark spotting and barring, and orange-buff thighs and undertail coverts (Grimmett et al. 2011). The Amur Falcon is a longdistance, trans-equatorial migrant (Bildstein 2006) that migrates across three flyways, namely, the East Asia/ East Africa Flyway, the Central Asian Flyway, and the East Asia/Australasia Flyway (BirdLife International 2015). The breeding range is currently restricted to northeastern China, southeastern Russia, North Korea, and eastern Mongolia (Corso & Catley 2003). Amur Falcons typically prefer temperate grassland, temperate forest, and inland wetland as breeding habitats (BirdLife International 2023). The available literature has shown that Amur Falcons depart from their Asian breeding range usually in the month of October, refuel at many stopovers before ultimately arriving at their wintering sites like Eswatini (BirdLife International 2023), Angola (Pinto 1983), Botswana (Penry 1994), Africa (Bildstein et al. 2000; Bildstein 2006; Darren & Craig 2010), Lesotho (Kopij 2012), Mozambique (Symes & Woodborne 2010), Namibia (Symes & Woodborne 2010), South Africa (Clement & Holman 2001; Bildstein 2006; Symes & Woodborne 2010), Zambia (Dowsett et al. 2008; Symes & Woodborne 2010), and Zimbabwe (Irwin 1981; Symes & Woodborne 2010). Northeastern India is one of the stopover sites to prepare for an arduous journey across the Indian mainland, Arabian Sea, and the Indian Ocean (Ali & Ripley 1987; Naoroji 2011) before arriving at the African continent (Clement & Holman 2001; Bildstein 2006).

Although D'Ering Memorial Wildlife Sanctuary in Arunachal Pradesh is a well-known important bird area (IBA), there has been relatively little ornithological research on it, as a review of the ornithological work indicated that reports and literature on the birds of this sanctuary are scarce. Additionally, there are no detailed reports of Amur Falcons from this sanctuary except a photographic record of one individual nine years ago with limited details (Dhar 2013), which indicates no proper scientific documentation of this species in the sanctuary. Hence, we conducted a study to evaluate avian diversity and seasonal changes of avifaunal species and assess threatened species in the sanctuary. The present paper is part of the study in which we report the repeated summer record of Amur Falcons *Falco amurensis* to promote protection of the bird as well as avian tourism in the area.

MATERIALS AND METHODS

Study site

The study was conducted in the D'Ering Memorial Wildlife Sanctuary (Image 1), hereinafter DEMWS, located in the East Siang district of Arunachal Pradesh, 13 km away from the district headquarter, Pasighat. It has coordinates of 27.850–28.083 N and 95.366–95.483 E, an elevation range of 135–140 m, and covers an area of 190 km². The sanctuary is mostly grassland (80% of the total area), and the rest is riverine forests and patches of sub-tropical forests. DEMWS falls under Indo-Malayan Biogeographic zone along with rest of the north eastern region of India.

Methods

The modified line transects method (Bibby et al. 2000) was used during the bird surveys; observation was done at 0500–1000 h and 1500–1800 h in the afternoon. Using a Garmin GPS (geographic positioning system) device, the locations of sightings were recorded and marked. Birds were properly identified following the field guides of Grimmet et al. (2011) and Arlott (2015). A Nikon D5200 fitted with a Sigma 150–600 mm telephoto lens was used to capture photos of birds as part of a routine procedure.

RESULTS

On 14 May 2021, while surveying for avian diversity and seasonal changes in the Jeepghat Range of DEMWS (Image 1), the team came across a pair of raptors at 27.8559°N, 95.4217°E and 27.8554°N, 95.4205°E coordinates, roosting in a Silk Cotton tree *Bombax ceiba* (Image 2). Later on, it was identified as a pair of Amur Falcons. Subsequently, the team surveyed the same area on 16 May 2021, to confirm the occurrence of the Amur Falcon at the site. Following this, the team subsequently spotted a flock of Amur Falcons, consisting of nine males and 15 females, sitting on a Candahar tree *Gmelina arborea*, in the same area. Again, the team captured





Image 1. Map of D'Ering Memorial Wildlife Sanctuary with the sighting location (developed by using Arc GIS Version 10.4).

images of the birds to substantiate the sighting (Image 3). Thereafter, the bird was sighted in the same area for around a week. The surrounding habitat types where the species were spotted were open grassland with scattered trees and shrubs (Image 4). Recently, on 09 May 2023, while surveying in the Anchalghat near Jeepghat range of the sanctuary at 27.8557°N & 95.3848°E coordinates, a total of 28 Amur Falcons were sighted hovering over the sky.

DISCUSSION

In northeastern India, there are reports of sightings at Krungming Reserve Forest, Khorongma and Kopili-Umrangsu Reservoirs, Habang, Karbi Anglong District in Assam, Doyang reservoirs and Pangti forest in Nagaland, and Dailong Rongku forest in Manipur (BirdLife International 2022). The first ever sighting of an Amur Falcon in Arunachal Pradesh was reported in October 1992 in Naharlagun (Singh 1995). Thereafter, it was completely unknown about further sightings in the same area. In November 2020, a flock of Amur Falcons in good numbers in flight was reported, and a killed specimen at the market was spotted at Niausa Village in the Longding District of Arunachal Pradesh (Echo of Arunachal, 2020), approximately 200 km from the Doyang stopover site in Nagaland. Other recent records of this species in India include Madhya Pradesh (Naoroji 2011), Gujarat (Ganpule 2011), Uttar Pradesh (Bhargava et al. 2014), Chhattisgarh (Dutta 2016), and various unpublished sighting records are available in the Global Biodiversity Information Facility (GBIF, 2023). Various published and unpublished sighting locations of the Amur Falcon Falco amurensis are presented in Image 5. The published sighting records of the Amur Falcon at all the aforementioned sites in the north-east and other parts of India occurred during the month of November, i.e., winter. It is therefore likely that all sites are stopover or refuelling sites for the onward leg of the journey. Similarly, there are a few unpublished sighting reports of the Amur Falcon from several places in the Longding

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Image 2. Pair of Falcon Falco amurensis in D'Ering Memorial Wildlife Sanctuary.



Image 3. Flock of Amur Falcon *Falco amurensis* in D'Ering Memorial Wildlife Sanctuary.



Image 4. Surrounding habitat types of the Amur Falcon sighting location.

district of Arunachal Pradesh, all of which occurred during October and November, i.e., during the winter season (Northeast Now 2022). Hence, not only the repeated sighting of the Amur Falcon but also a sighting during the month of May in DEMWS is a record of its kind, as there is no earlier report in the month of May in Arunachal Pradesh.

Although this raptor has been classified as 'Least Concern' due to their large population size and vast range, because of their flocking behaviour during migration and the density at which it occurs, they are vulnerable to hunting and extremely high levels of persecution along their migration routes (BirdLife International 2023). Despite efforts to enforce strict measures to prevent the hunting of amur falcons, illegal hunting of these raptors continues to take place in certain areas of northeastern India. For instance, recent reports of some people engaged in the illegal practice of hunting these birds by using catapults in certain areas of the Wokha district of Nagaland (Nagaland Post 2023). Also, there was a report circulated on social media (WhatsApp) recently that some roasted Amur Falcons were being sold in Longding



Image 5. Map of India indicating the various published and unpublished sighting locations of the Amur Falcon Falco amurensis (developed by using Arc GIS Version 10.4).

Market. This is concerning for the conservation of this bird. Most of these hunters belong to economically backward and uneducated villagers; therefore, it is of utmost importance to educate these villagers with frequent awareness programmes. It is also essential to identify and develop the areas where these migratory birds rest during their journey as tourist spots, which would attract tourists, especially wildlife enthusiasts. Therefore, as DEMWS is a protected area, it will be a safe stopover site as human disturbances are lower than in other north-eastern migratory routes such as the Doyang roosting site in Nagaland (Dalvi et al. 2013) and Manipur (Sharma 2018). Moreover, most parts of DEMWS are grasslands; they support various insects for this insectivorous raptor, like Caelifera (grasshoppers), Ensifera (crickets), and Coleoptera (beetles). Thus, DEMWS may be a significant flyway for this migratory species and a preferred stopover or refuelling site in the future. Therefore, the present paper is an attempt to report the repeated summer record and to highlight DEMWS as likely one of the important stopover sites during the backward journey from the wintering grounds

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of this migratory raptor to promote protection of the bird as well as avian tourism in the area.

CONCLUSIONS

The presented report is the substantiated record of the Amur Falcon *Falco amurensis*, with photographic evidence in the DEMWS of Arunachal Pradesh during May, i.e., the summer season, the time for the backward journey of this migratory raptor from its wintering place to its breeding ground. It is significant information for ornithologists, as the recent sighting in the sanctuary is the second well documented records of the raptor during the summer in the state. Though there are many sighting reports of the Amur Falcon from many places in India, all are onward journeys (October and November). Hence, not only the repeated sighting of the Amur Falcon but also its sighting during the month of May in DEMWS is the record of its kind.

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

March 2024 | Vol. 16 | No. 3 | Pages: 24819–25018 Date of Publication: 26 March 2024 (Online & Print) DOI: 10.11609/jott.2024.16.3.24819-25018

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