Status and identification of the Christmas Island Frigatebird *Fregata andrewsi* in South Asia

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Abstract

Christmas Island Frigatebird *Fregata andrewsi* is a rare visitor to South Asia. Through this study, we sought to enumerate the number of sightings of this species through verification of all the published and unpublished records, and map their distribution within South Asia. In the process, we documented the character traits for distinguishing this species from other frigatebird species recorded in the area, using annotated photographs of these birds. We recorded a total of 22 records of the species in South Asia—12 in India and ten in Sri Lanka. Nine of these have been published previously and 13 are published here. Lastly, we assessed the status of Christmas Island Frigatebird as a vagrant bird in South Asia.

Introduction

Frigatebirds are spectacular, large, shapely, and highly aerial seabirds that roam the tropical oceans of the world. Of the five species around the world, three occur in the Indian Ocean and South Asia (James 2004; Rasmussen & Anderton 2012; Praveen et al. 2016). These three species are Christmas Island Frigatebird *Fregata andrewsi* (hereinafter, CIFR), Great Frigatebird *F. minor* (hereinafter, GRFR) and Lesser Frigatebird *F. ariel* (hereinafter, LEFR). Throughout most of South Asia (as defined by Rasmussen & Anderton 2012; see Methods), frigatebird species as a whole occur infrequently at best, and mostly not at all (Rasmussen & Anderton 2012; Praveen et al. 2013; Praveen 2025). However, both LEFR and GRFR occur regularly in the remote south-western archipelagos of South Asia, and both species breed in the Chagos (Rasmussen & Anderton 2012; Carr 2015; Carr 2025).

CIFR is a rare and threatened species that breeds only on the Christmas Island (10.447°S, 105.690°E) in the tropical eastern Indian Ocean (James & McAllan 2014). With a global population of around 2,500 to 5,000 mature individuals (Morris-Pocock et al. 2012; James & McAllan 2014) and declining, it is listed as a Vulnerable species both internationally (BirdLife International 2022) and in its only natal range state, Australia (Macgregor et al. 2021). As the most endangered species in its small and distinctive family, it is also a priority-ranked EDGE (Evolutionarily Distinct and Globally Endangered) species (McClure et al. 2023). It is known to migrate to Southeast Asia (BirdLife International 2001; James & McAllan 2014; Hennicke et al 2015), but has also been recorded as a vagrant much farther afield, for example in Hong Kong (Chalmers 2002), northern Australia (McMaster et al. 2015), South Africa (BirdLife South Africa 2024), Kenya (Mann 1989; Fisher & Hunter 2016), and Socotra (Marks et al. 2025). In South Asia, CIFR is poorly known and extremely rare, with very few records currently accepted in the entire region (Praveen et al. 2013; Karuthedathu et al. 2015; Manna et al. 2024).

Since the publication of the article on the "Identification of Christmas Island, Great and Lesser Frigatebirds" (James 2004), we have been collating records of frigatebird species from India, Sri Lanka and elsewhere, while helping others to identify frigatebird sightings. This has involved observing frigatebirds ourselves, monitoring the literature and other sources of records, and corresponding widely for 20 years. This process led to the publication of "A compilation of frigatebird sightings [in India] from 2014, including Christmas Island Frigatebird *Fregata andrewsi*" (Karuthedathu et al. 2015), but we have compiled more records since then from a wider area. In 2024, a number of frigatebirds were reported by birdwatchers (including PP, MK, LW, and GdSW) from India and Sri Lanka. This string of records includes a good number of CIFR, which has prompted us to review the status and identification of this species in South Asia.

Our objectives here are to: 1) Assess the validity of published records of CIFR from South Asia. 2) Collate and summarize all unpublished records of CIFR from South Asia. 3) Document the characters we have used to distinguish each CIFR record from the other frigatebird species by using photographs. 4) Map the distribution of records. and 5) Assess the status of CIFR in South Asia.

Methods

Geographical Scope: We followed the definitions of South Asia provided by Rasmussen & Anderton (2012) as used in *Indian BIRDS*. This includes the following countries and territory, in alphabetical order: Afghanistan, Bangladesh, Bhutan, the Chagos Archipelago (formerly British Indian Ocean Territory), India, Nepal, Pakistan, the Republic of Maldives, and Sri Lanka.

Record Collation: Since the mid-2000s, we have collected frigatebird records in South Asia from the scientific literature, grey literature, online sources and through our contact

networks. Triggered by the surge of frigatebird records in 2024, we adopted a more systematic approach to collect data. i) We searched the online 'Bibliography of South Asian Ornithology' (Pittie 2024) using the keyword '*Fregata andrewsi*'. This identified 66 references that we subsequently checked for details. ii) We accessed all frigatebird sightings from South Asia recorded in eBird checklists to find any that might be referred to as a CIFR, irrespective of the species identification attached to the checklist. iii) Initially, we collected records from 'Facebook' when we encountered them. Later, we actively searched for records in various 'Facebook' forums using combinations of the keywords 'Christmas Island Frigate' or 'Christmas-Island Frigate' or 'Fregata' followed by the names of appropriate places (with a plus in between). The places included India, Sri Lanka, and all of their coastal states or provinces. Variations of the same name (e.g. 'Christmas Island Frigate' or 'Christmas-Island Frigate') did not change the results in Facebook. The search covered 'Facebook' in general, and three large 'Facebook' groups: '*Indian Birds*', '*Ask IDS of Indian Birds*', and '*Birding Frnds*'). We reviewed our own archived records. We endeavoured to correspond with at least one author, photographer, or observer for each record, and in many cases, we contacted multiple stakeholders. The cut-off date for inclusion of records in this review was 31 December 2024.

Frigatebirds were identified to the species level where possible from photographs, following the principles and characters set out in James (2004). All identifications were either made or confirmed by DJJ. Since 2004, new information came to light and some field characters have been refined, changed or reworded, and consequently, James (2004) became somewhat out of date. However, a complete revision of frigatebird identification in the Indo-Pacific was beyond the scope of this work. As a compromise, brief notes are provided here to aid the interpretation of the annotated photographs.

The specific identification of adult frigatebirds is comparatively simple, but younger birds can be extremely difficult to identify. Age classification of young frigatebirds is discussed in detail below, but we use 'first cycle' as a term that covers all plumage stages up to the first full moult, such as juvenile and 'first immature'. Based on James (2004) and with subsequent learnings, the characters that we used to identify first cycle birds are in the box. See **[130, 131]** for illustrations of these features.

Primary and secondary characters used to identify Christmas Island Frigatebird.

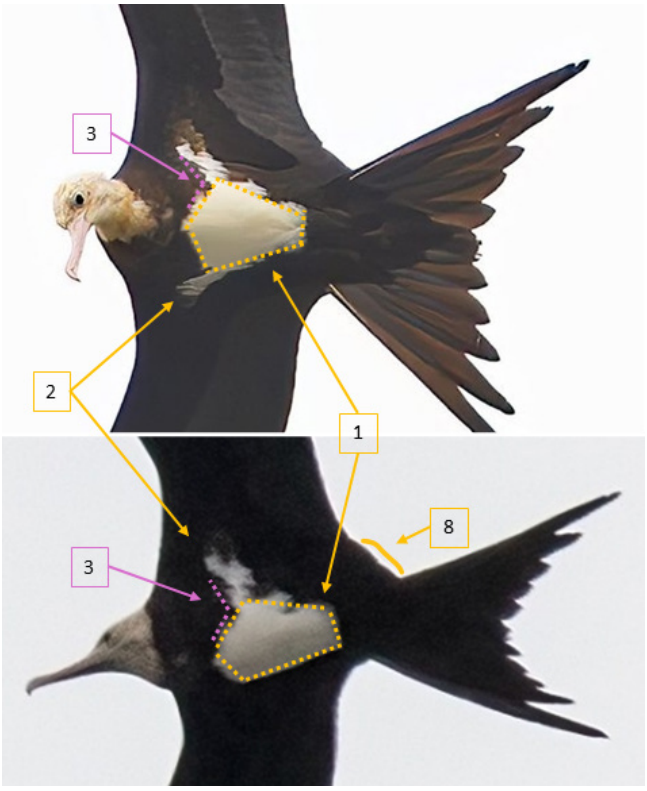
Primary characters:

1. The shape of the white belly patch is generally pentagonal (though not equilateral) in CIFR vs triangular in LEFR and oval in GRFR. This character becomes less reliable when the dark breast band starts moulting in the centre and begins to disappear.
2. The presence of axillary spurs angling forward, extending from the body onto the underwing, and usually parallel-sided (usually shorter and more pointed in LEFR, absent or pointing straight outwards and not reaching onto the underwing in GRFR).
3. A diagonal angle (about 120–140°) between the leading edge of the axillary spur and the leading edge of the belly patch. This angle is almost straight (about 150–170°) in LEFR, and almost perpendicular (about 95–110°) in GRFR.
4. The dark breast band is much shorter than the white belly patch in CIFR. The breast band is almost as long as the belly patch in LEFR. In GRFR the breast band is always strongly concave where it abuts the belly patch, which makes this character inapplicable.
5. The white belly patch extends behind the base of the legs in CIFR. It usually reaches no farther back than the base of the legs in the others.
6. A small number of CIFR have very bold pale scaling on the mantle. This is never present in GRFR, but can be faint in LEFR, so it is diagnostic of CIFR when bold.

Secondary characters:

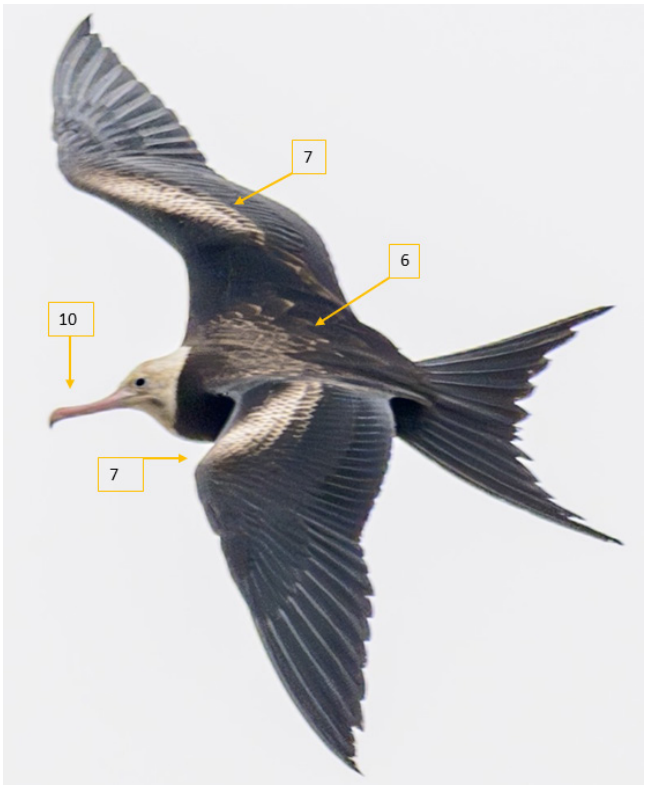
7. Bold pale scaling on the alar bars is usually wider and bolder in CIFR than the others, but this also varies with age and sex, and it always diminishes with feather wear.
8. CIFR usually shows a larger (longer and broader), bulging humeral arc (defined below) than the others.
9. CIFR has relatively larger wings, which often appear broader than the others. However, this character is subjective, and is often affected by foreshortening of the wing length and/or breadth. Although we have marked the breadth of the wing across the carpal on several photographs, we do not rely on it or consider it to be reliable.
10. CIFR has a longer bill than the others, which is often obvious.
11. CIFR is larger overall than the others, particularly LEFR. However, size is often difficult to judge accurately in both life and photographs, especially without experience, not unless photographed with a known species next to it

The presence of a distinct white spot on the scapulars on either side of the dorsum was previously considered diagnostic of CIFR. However, a bird showing this character alongside characters otherwise consistent with LEFR was found during this work. This has raised concerns about the reliability of this character.



Top: Akshay Charegaonkar, Bottom: Ramesh Shenai

130. Christmas Island Frigatebird, first cycle from Mumbai City, Maharashtra, India (Table 2, #17), ventral view. This bird was seen and photographed by many during its extended stay in the Colaba area of Mumbai City during late July and early August 2024. Identification notes: (1) belly patch generally pentagonal with broad rear, but its apparent shape varies with the angle of view due to foreshortening and the curved surface of the body; (2) spurs strap-like and angled forward, also varies with the angle of view; (3) angle between spur and belly patch ~135°; and (8) large humeral arc.



Ketan Ankleśaria

131. Christmas Island Frigatebird first cycle from Mumbai City, Maharashtra, India (Table 2, #17), dorsal view (same bird as **[130]**). Identification notes: 6) bold white scaling on the dorsum (mantle and scapulars) is diagnostic of CIFR if present, but uncommon; (7) pale scaly alar bars are present on all frigatebirds, but are bolder on CIFR than other species; and (10) long bill; also note the pointed tips to tail feathers and outer primaries, which indicate that these are retained juvenile feathers.

All of these characters vary between individuals, and most involve some level of qualitative assessment, particularly the secondary characters. The plumage aspect on frigatebirds is not static, but changes gradually with moult and wear; characters most affected by these processes are 4, 5, 7, and 8. Assessing the ventral features often depends upon the angle of the view, because the body (housing the all-important breast band, belly patch, and much of the axillary spurs) is curved, while the underbody and underwing are not in the same plane. Some photographic records of frigatebirds contain only angles not conducive for identification, or are low resolution (they are often seen very distantly), poorly lit, or showing apparently conflicting characters, all of which can hamper a confident diagnosis. Recognizing these limitations, we have tried to err on the side of caution, and have always relied on multiple characters to verify an identification.

The 'humeral arc' is a novel field character relevant only to frigatebirds. Humeral feathers (or humerals) are flight feathers that grow out of the humerus, between the body and the secondaries, and only a few families of larger birds seem to have them (Marchant & Higgins 1990). Frigatebirds have three or four particularly large humerals that extend behind the trailing edge of the secondaries and form a bulge at the rear base of the wing. This bulge or 'arc' is often much larger (longer and broader) in CIFR than the other species. However, they can be spread, folded, and moulted, showing substantial variation, and the full efficacy of this character requires further evaluation.

Ageing: A plumage cycle (or simply a cycle) is the period from a given plumage stage to the next occurrence of that same (or analogous) plumage. A cycle may include one, two, or more distinct moults depending on the species involved (Marchant & Higgins 1990; Howell 2010). In most bird species, cycles typically take one year, but in rare cases they can be shorter or longer. Howell (2010) argued that frigatebirds take about two years to complete a plumage cycle, due to the energy demands involved in replacing their very large feathers, and reach maturity at about ten years of age. Thus, ageing frigatebirds as 'first year', 'second year', and so forth (sensu James 2004) is not accurate. We aged birds using the term 'cycle' instead of 'year', so 'first cycle', 'second cycle', and so forth. Many of the frigatebirds reported in this study were first cycle birds (between about 9 and 18 months old) or second cycle birds (about 2–3 years old).

Young frigatebirds usually start replacing their orange or buff juvenile (first generation) head feathers before they leave their natal islands. The new (second generation) feathers are also buff, but are 'formative' (not 'juvenile') plumage (as in Howell 2010). Strictly speaking, they are no longer in 'juvenile plumage', but are entering 'formative plumage', even though most of their feathers are still 'juvenile' ones. We avoided using either of these terms and classified both as 'first cycle' birds. However, we have used the term 'juvenile' for referring to the first generation of flight feathers, some of which may be retained for two years or more before they are moulted. For convenience, we considered a bird to pass from first cycle to second cycle when there was evidence

of flight feather moult in the wings. Where possible, we have estimated the actual age of younger CIFRs in months (e.g., ~14 mo old), based on an average hatching date of mid-May (James 2003).

Seasonality in the observations of frigatebirds in South Asia was examined by tabulating the observations. Frigatebird sightings were classified as CIFR, LEFR, GRFR, and 'ALL' (all frigatebirds combined including ones not identified to species). Observations were pooled into three periods of four-months: i) pre-monsoon, with mostly dry and hot weather (February to May); ii) monsoon, with high but varying rainfall (June to September); and iii) post-monsoon, with mostly dry and slightly cooler conditions (October to January). Multiple observations of the same species and age class on the same or subsequent days at the same or close localities were treated as a single data point.

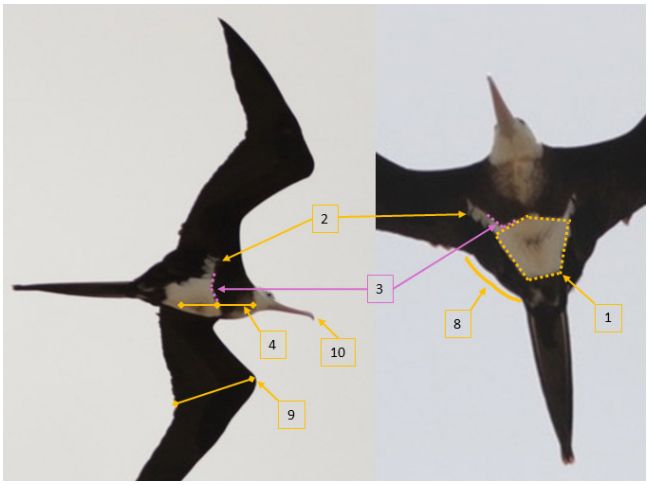
We have listed all the relevant details of these records and prepared a map using QGIS 3.28.9-Firenze. Supplementary material from this research is archived at Zenodo (https://doi.org/10.5281/zenodo.16908738). It includes two files: i) Detailed information regarding the verified records of CIFR from South Asia (Supplementary Table 1). ii) Brief information about records of non-CIFR frigatebirds and potential CIFRs from South Asia (Supplementary Table 2).

Results

In total, we found 22 records of CIFR from South Asia, 13 of which were not published before.

Published records: We found nine published records of CIFR from South Asia that qualify as valid. Eight of them are from India, and one is from Sri Lanka. They are summarized in Table 1 and mapped in Fig. 1. Published records and claims of CIFR from India and Sri Lanka, including ones that we do not consider to be certain, are discussed further below. CIFR was tentatively listed for the Chagos Archipelago by Carr (2015). Circulated photographs of three birds viewed by DJJ (dated 13 July 2009, 7 October 2009, 4 March 2013) might be CIFR, but are likely LEFR. Carr (2025) did not list CIFR for the Chagos Archipelago and we do not accept any records for there. We located no published reports of CIFR from the three countries in South Asia that are landlocked (Afghanistan, Bhutan, and Nepal), nor any from three others with coastlines (Bangladesh, Pakistan, and the Republic of Maldives).

Fig. 1. Map showing locations of all verified records of Christmas Island Frigatebird in South Asia up to 31 December 2024. The white labels show the tag numbers corresponding to Table 1 and Table 2.



Kithsiri Gunawardena

132. Christmas Island Frigatebird *F. andrewsi*, first cycle from Northern Province, Sri Lanka (Table 1, #01); see Gunawardena (2010). Identification notes: (1) belly patch generally pentagonal with broad rear; (2) spurs strap-like and angled forward; (3) angle between spur and belly patch ~135°, depending on viewing angle; (4) belly patch longer than breast band; (8) large humeral arc; (9) wing broad across carpal; and (10) long bill.

Table 1. Verified published records of Christmas Island Frigatebird from South Asia

No	Date	Location	Age	Plate	References
01	27 May 2010	Arippu, Mannar, Northern Province, Sri Lanka	1st cycle ~12 mo old	[132]	Gunawardena (2010); sr01
02	27 July 2014	Belambar, Ankola, Karnataka, India	1st cycle ~14 mo old	-	Karuthedathu et al. (2015)
03	06 August 2014	Malpe Port, Udupi, Karnataka, India	1st cycle ~15 mo old	-	Karuthedathu et al. (2015)
04	17 August 2014	Purakkad, Alappuzha, Kerala, India	Adult female >8 yr old	-	Karuthedathu et al. (2015)
05	27 August 2014	Rameswaram, Ramanathapuram, Tamil Nadu, India	1st cycle ~15 mo old	-	Karuthedathu et al. (2015)
06	04 September 2014	Manavalakurichi, Kanyakumari, Tamil Nadu, India	Adult male >8 yr old	-	Karuthedathu et al. (2015)
07	29 June 2019	Chombala Harbour, Kozhikode, Kerala, India	1st cycle ~13 mo old	[133]	Vishnudattan & Meppayur 2019; Paleri et al. (2022)
08	21 May 2020	Thakdari, North 24 Parganas, West Bengal, India	1st cycle ~12 mo old	[134]	Manna et al. (2024)
09	20 May 2021	Mahuva, Bhavnagar, Gujarat, India	2nd cycle ~2 yr old	[135]	Bhil & Bhil (2021)

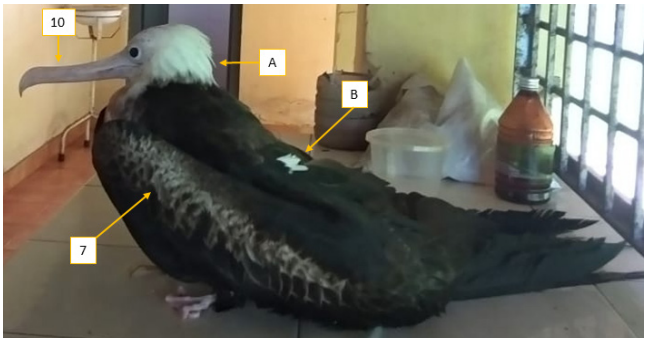
* sr = supplementary references

Table 2. Previously unpublished records of Christmas Island Frigatebird from South Asia.

No	Date & time	Location	Age & sex	Observer(s)	Plate	Sources*
10	31 May 2008 ~1100 h	Mutuwal, Colombo, Western Province, Sri Lanka	1st cycle ~12 mo old female?	GdSW	[136]	GdSW
11	17 August 2018 ~1515 h?	River Tern Lodge, Bhadra, Chikkamagaluru, Karnataka, India	1st cycle ~15 mo old female?	RB et al.	[137]	sr02
12	3 October 2020 1419 h	Bambalapitiya, Colombo, Western Province, Sri Lanka	1st cycle ~17 mo old female?	MK	[138]	sr03
13	21 January 2021 1809 h	Madampe, Puttalam, North Western Province, Sri Lanka	1st cycle ~20 mo old	KGo, KK, RJ	[139]	sr04
14	30 June 2024 1754 h	Puthuvype Beach, Ernakulam, Kerala, India	1st cycle ~13 mo old	PP	[140]	sr05
15	17 July 2024	Koneswaram Temple of Trincomalee, Trincomalee, Eastern Province, Sri Lanka	1st cycle ~14 mo old	JF	[141]	sr06
16	21 July 2024 0704 h	Chilaw Beach, Puttalam, North Western Province, Sri Lanka	1st cycle ~14 mo old	SD	[142]	sr07
17	26 July to 8 August 2024	Colaba, Mumbai City, Maharashtra, India	1st cycle ~14 mo old female?	KK, ShJ, SC, KA, SG, PdP, SA, PG, PM, TA, AC, RS, CR, NA, AR, BM, JR, PK, Vi, SK, ZS, MP, SuJ, AyW, AbW, AM, GG et al.	[130, 131]	sr08 to sr17
18	30 July 2024	Colaba, Mumbai City, Maharashtra, India	1st cycle ~14 mo old	NF	[143]	sr18
19	31 August 2024 ~1620 h	Hotel Club Palm Bay, Marawila, Puttalam, North Western Province, Sri Lanka	1st cycle ~15 mo old	HP	[144]	sr19
20	02 September 2024 0800 h	Olaiththoduvai Point, Mannar, Northern Province, Sri Lanka	1st cycle ~16 mo old	LW	[145]	sr20
21	03 September 2024 ~1015 h	Pitipana, Gampaha, Western Province, Sri Lanka	1st cycle ~16 mo old male?	ShB	[146]	sr21
22	02 December 2024 0646 h	Olaiththoduvai Point, Mannar, Northern Province, Sri Lanka	1st cycle ~19 mo old female?	LW	[147]	sr22

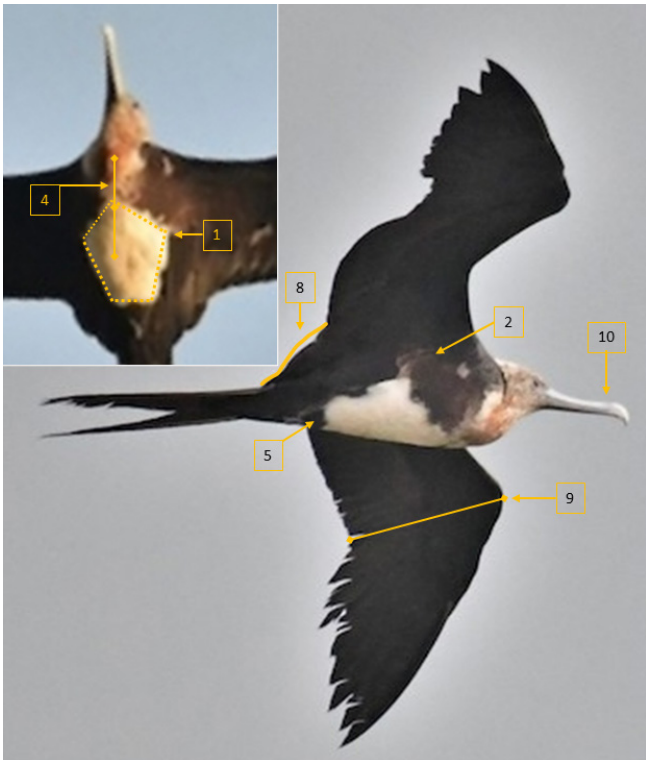
Where the details differ from those in the sources cited, we have communicated with the observers to obtain accurate data.

* sr = supplementary references.



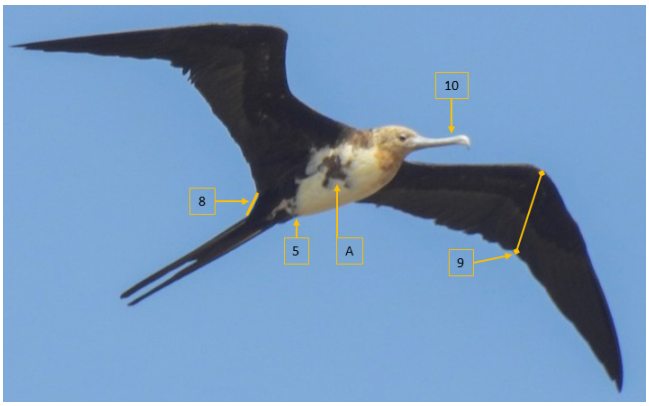
Abdulla Paleri

133. Christmas Island Frigatebird first cycle from Kozhikode, Kerala, India (Table 1, #07); see Vishnudattan & Meppayur (2019) and Paleri et al. (2022). Identification notes: (7) alar bar worn but still very broad and prominent; (10) long bill; (11) very large size; (A) nape feathers slightly elongated forming short shaggy crest (diagnostic); (B) displaced white feathers, possibly axillaries; other photos show a prominent axillary spur too large for GRFR.



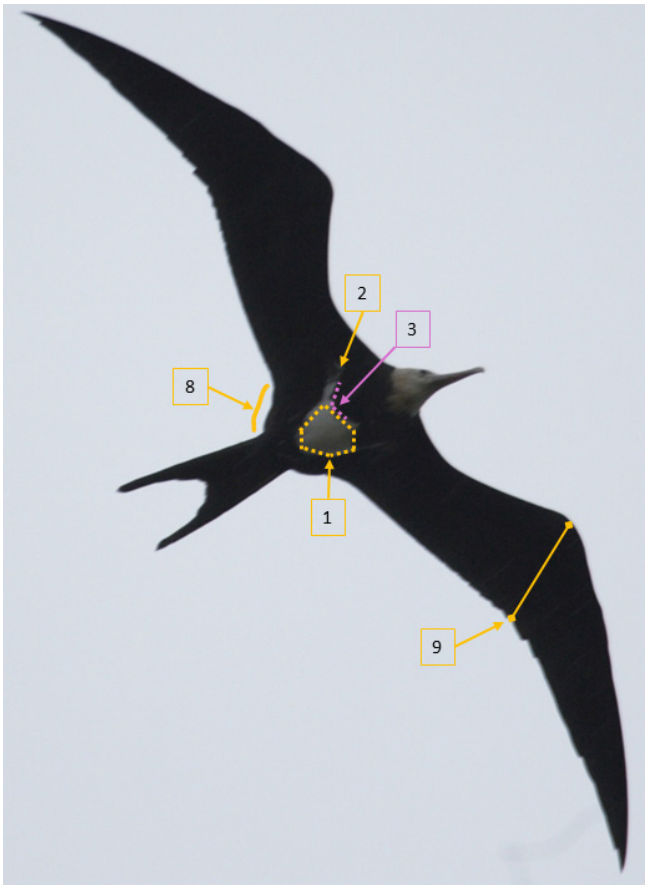
Anirban and Arka Bhaduri

134. Christmas Island Frigatebird first cycle from North 24 Parganas, West Bengal, India (Table 1, #08); see Manna et al. (2024). Identification notes: (1) belly patch generally pentagonal with broad rear; (2) lack of spurs (actually very faint); which sometimes occurs in 1st cycle CIFR, usually in GRFR, but never in LEFR; (4) belly patch longer than (former) breast band; (5) white belly extends behind base of legs; (8) large humeral arc; and (9) wing broad across carpal.



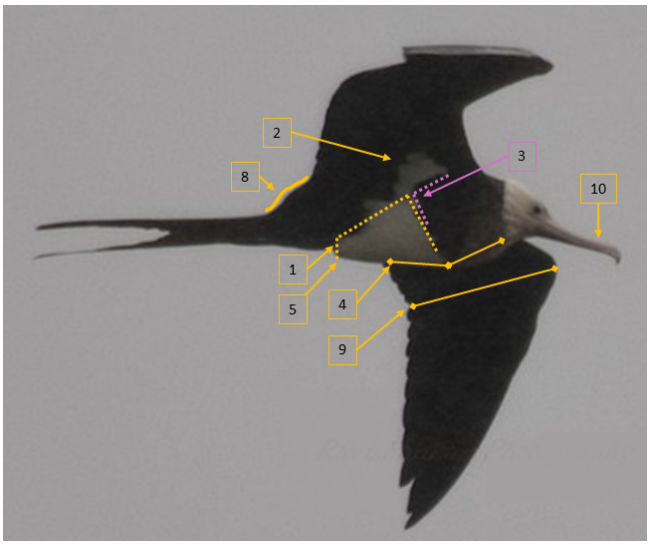
Batuk Bihl

135. Christmas Island Frigatebird second cycle, probably female from Bhavnagar, Gujarat, India (Table 1, #09); see Bihl & Bihl (2021). Identification notes: belly patch shape and spur angle no longer helpful in 2nd cycle birds; but (5) white belly extends behind base of legs, particularly important in 2nd cycle when GRFR and LEFR develop black belly; (8) humeral arc small and unhelpful; (9) wing broad across carpal; (10) bill extremely long; and (A) prominent black breast tab developing; the long bill and white belly indicate a female.



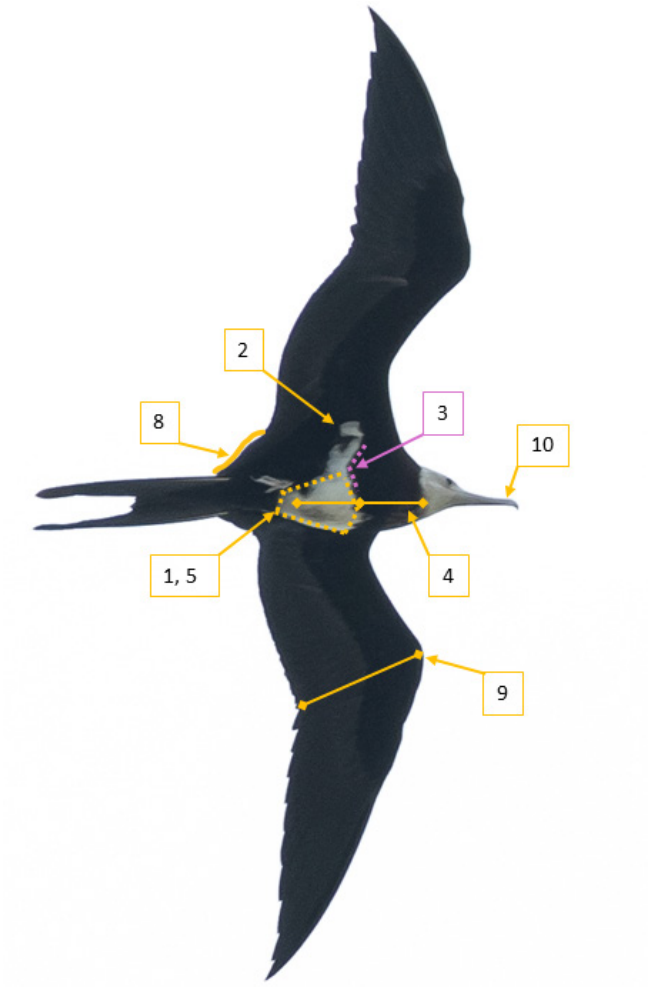
Gehan de Silva Wijeyeratne

136. Christmas Island Frigatebird first cycle from Western Province, Sri Lanka (Table 2, #10). (1) moult is changing the shape of the belly patch making it less reliable for identification; but (2) spurs strap-like and angled forward; (3) angle between spur and belly patch ~135°; (8) long, large humeral arc; and (9) wing broad across carpal.



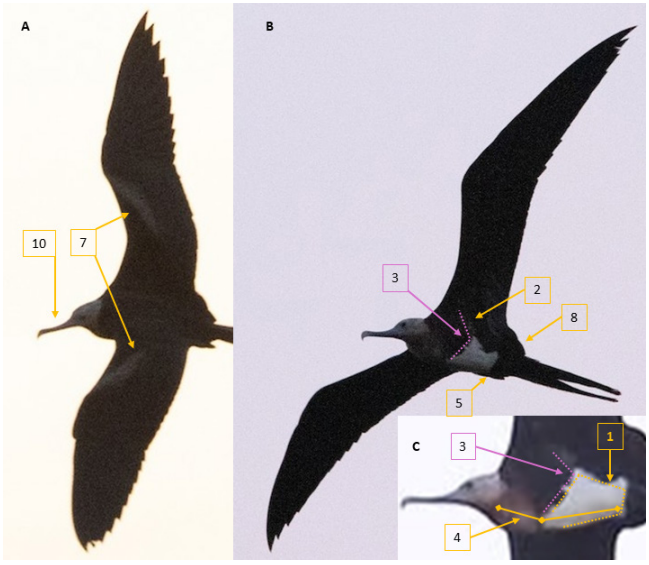
Ravishankar Bangalore

137. Christmas Island Frigatebird first cycle from Chikkamagaluru, Karnataka, India (Table 2, #11). Identification notes: (1) although belly patch is not fully visible, the visible part is half a pentagon with a broad rear; (2) unusual bulging blunt-ended spurs (not seen in LEFR and GRFR); (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (5) white belly extends behind base of legs; (8) long humeral arc; and (9) wing broad across carpal.



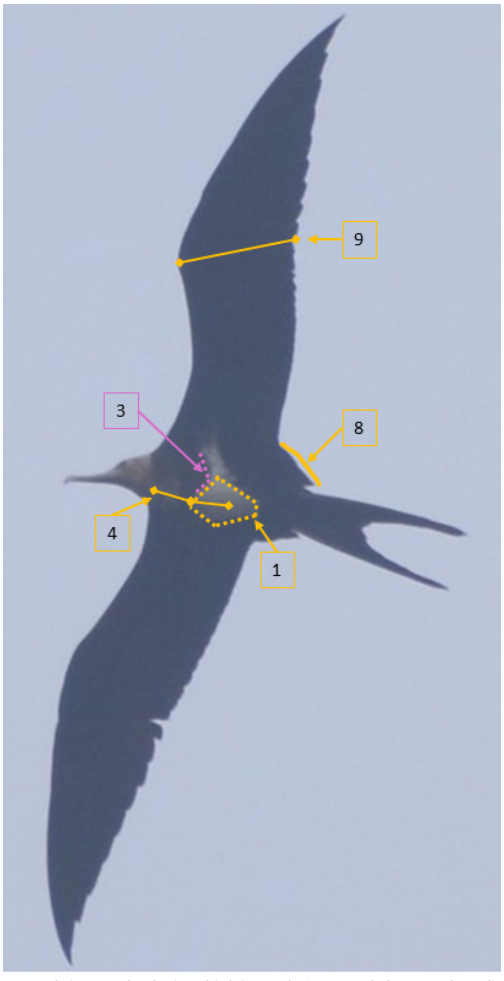
Moditha Kodikara Arachchi

138. Christmas Island Frigatebird first cycle from Western Province, Sri Lanka (Table 2, #12). Identification notes: (1) belly patch generally pentagonal with broad rear; (2) spurs strap-like and angled forward; (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (5) white belly extends behind base of legs; (8) large humeral arc; (9) wing broad across carpal; and (10) long bill.



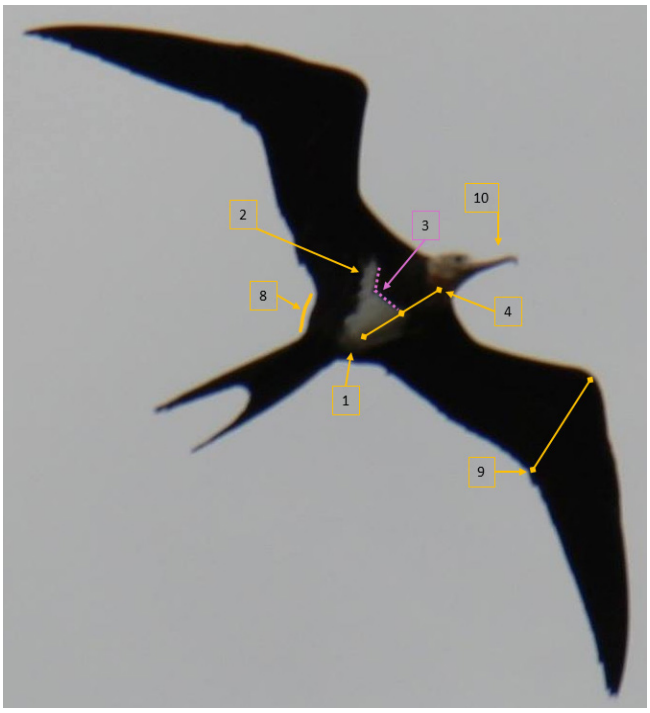
Kasun Gonagala (A and B) and Ravisara Jayamanna (C)

139. Christmas Island Frigatebird first cycle from North Western Province, Sri Lanka (Table 2, #13). Identification notes: (1) belly patch generally pentagonal (unusually irregular but not oval or triangular) with broad rear; (2) spurs very obscure, but still angled forward; (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (5) white belly extends behind base of legs; (7) unusually dull alar bars, possibly due to individual variation, extreme plumage wear, and/or low light conditions; (8) long and broad humeral arc; and (10) long bill.



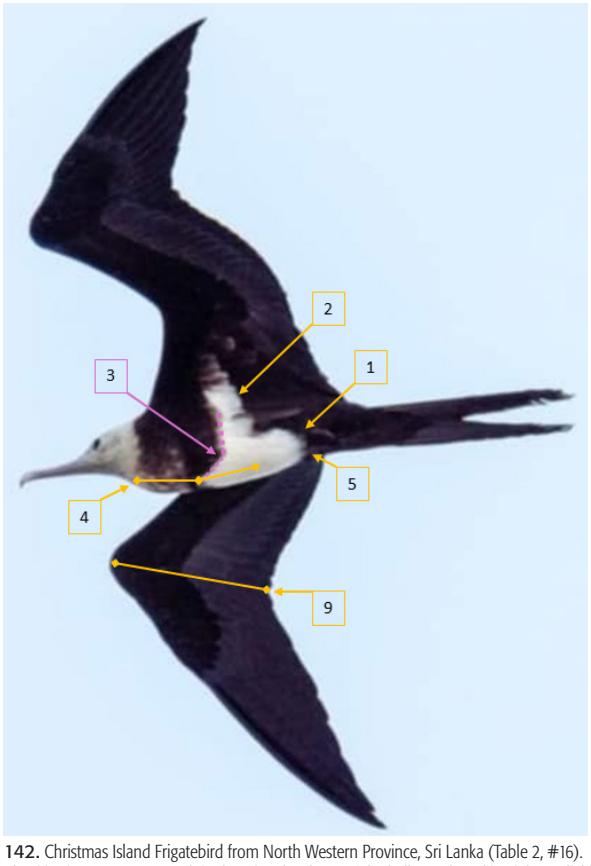
Paul Pop

140. Christmas Island Frigatebird first cycle from Ernakulam, Kerala, India (Table 2, #14). Identification notes: (1) belly patch generally pentagonal, although rear not very broad; (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (8) long humeral arc; and (9) wing broad across carpal.



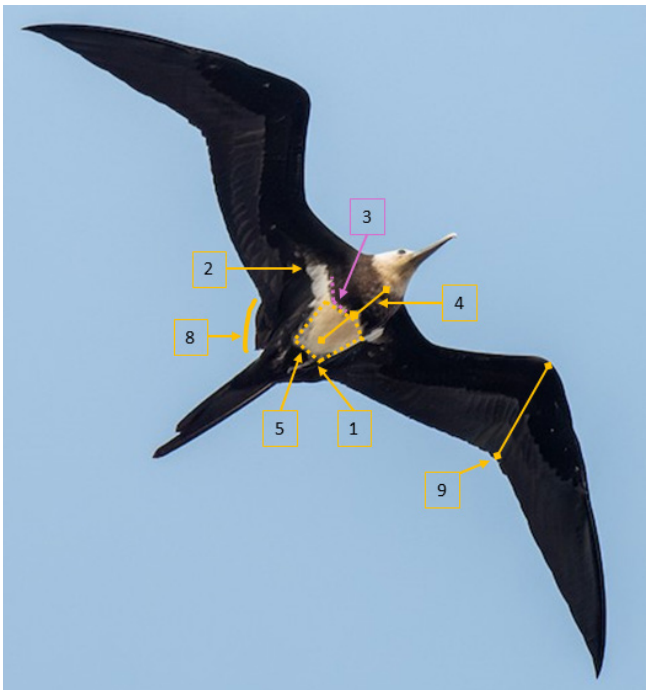
Johan Feenstra

141. Christmas Island Frigatebird first cycle from Eastern Province, Sri Lanka (Table 2, #15). Identification notes: (1) the belly patch is not fully visible in the single photo available, but it fits the generally pentagonal shape of CIFR; (2) spurs strap-like and angled forward; (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (8) large humeral arc; (9) wing broad across carpal; and (10) long bill.



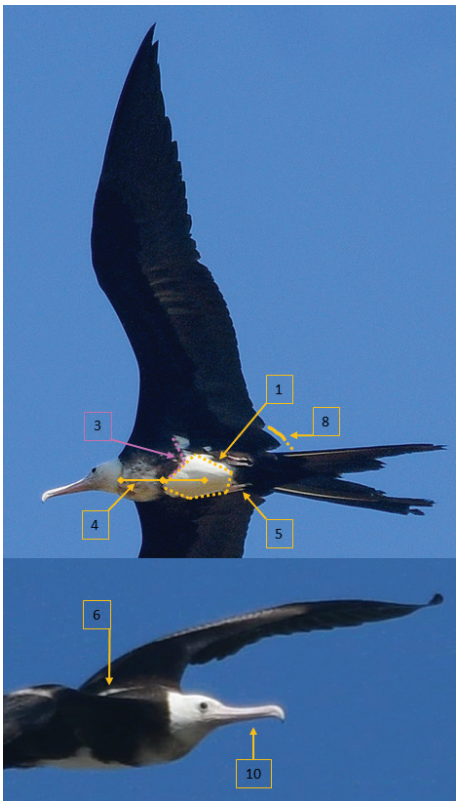
Shehan Dondeenu

142. Christmas Island Frigatebird from North Western Province, Sri Lanka (Table 2, #16). Identification notes: (1) moult is changing the shape of the belly patch making it less reliable for identification; but (2) spurs strap-like and angled forward; (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (5) white belly extends behind base of legs; and (9) wing broad across carpal.



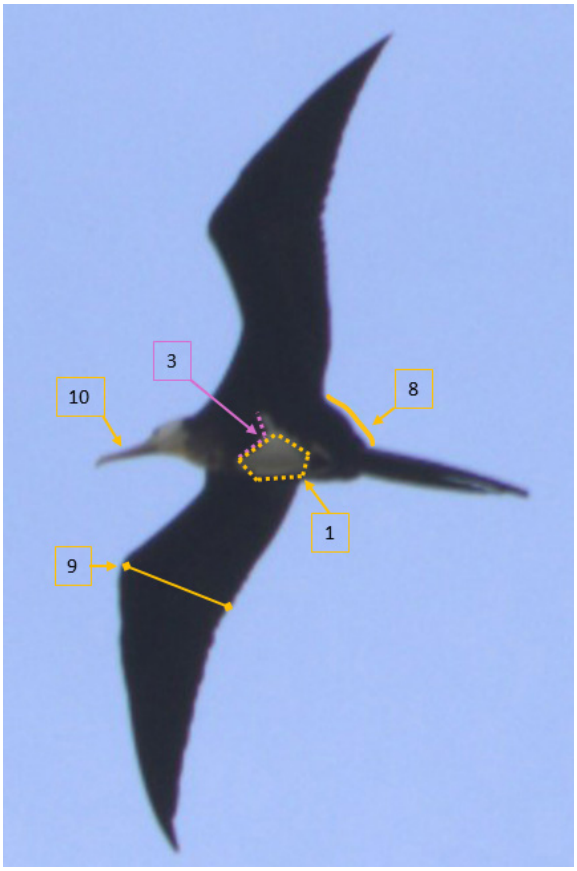
Najmuddin Fakhruddin

143. Christmas Island Frigatebird first cycle from Mumbai City, Maharashtra, India (Table 2, #18). Remarkably, this is a different individual to the bird seen by many observers in the same area of Mumbai City during the same time period, and shown in **[130, 131]**. Identification notes: (1) belly patch generally pentagonal with broad rear; (2) spurs strap-like and angled forward; (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (5) white belly extends behind base of legs; (8) large humeral arc; and (9) wing broad across carpal.



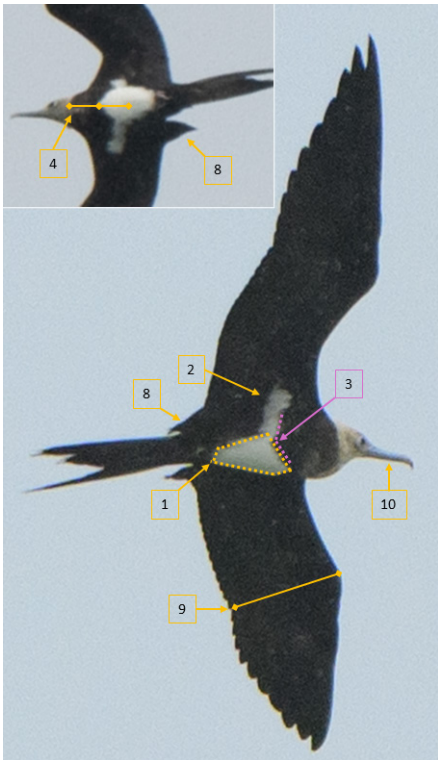
Lahiru Walpita

145. Christmas Island Frigatebird first cycle from Northern Province, Sri Lanka (Table 2, #20). Identification notes: (1) belly patch generally pentagonal with broad rear; (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (5) white belly extends behind base of legs; (6) bold white scaling on dorsum just apparent; (8) humerals in moult but still large; and (10) long bill.



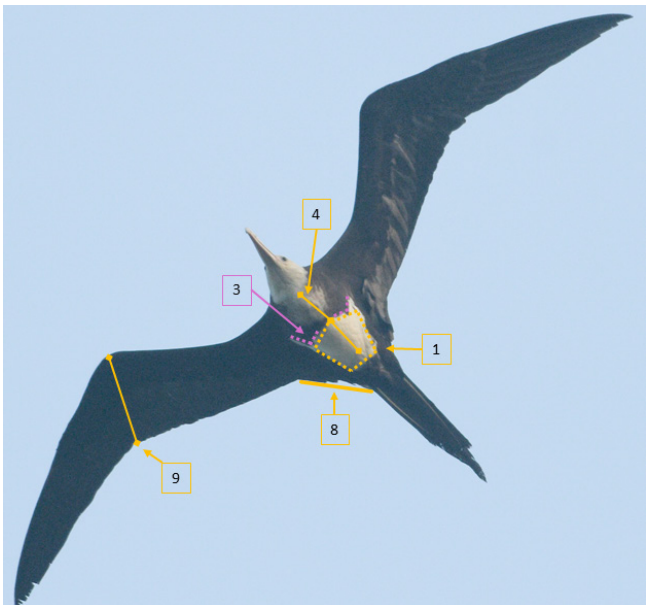
Hasitha Perera

144. Christmas Island Frigatebird first cycle from North Western Province, Sri Lanka (Table 2, #19). Identification notes: (1) belly patch generally pentagonal with broad rear; (3) angle between spur and belly patch ~135°; (8) large humeral arc; (9) wing broad across carpal; and (10) long bill.



Shashika Bandara

146. Christmas Island Frigatebird first cycle from Western Province, Sri Lanka (Table 2, #21). Identification notes: (1) belly patch generally pentagonal with broad rear; (2) spurs strap-like and angled forward; (3) angle between spur and belly patch ~ 135°; (8) humerals in moult but still long; (9) wing broad across carpal; and (10) long bill.



Lahiru Walpita

147. Christmas Island Frigatebird first cycle from Northern Province, Sri Lanka (Table 2, #22). Identification notes: (1) belly patch generally pentagonal with broad rear; (3) angle between spur and belly patch ~135°; (4) belly patch longer than breast band; (8) humerals folded so not bulging, but very long; and (9) wing broad across carpal.

CIFR has had a vexed history on Sri Lanka's bird list. Despite earlier claims, Phillips (1978) and Ali & Ripley (1983) considered all records to be dubious. CIFR was then included for Sri Lanka by De Silva (1990):30 for "A few (mostly dubious) records", and by De Silva et al. (2006) and Kotagama & De Silva (2006) without details or references. Later however, De Silva (2011a; 2011b) expressed doubts about the validity of all CIFR records from Sri Lanka. Subsequently, Rasmussen & Anderton (2012):54 listed CIFR for Sri Lanka, based on a sight record of a "juvenile… supported by [a] sketch and in direct comparison with" GRFR. Apparently, they were referring to Warakagoda (1992a), but this and related claims of CIFR by Warakagoda (1992a, 1992b) and Hoffmann (1991) contain insufficient details to be confirmed by us. The only published record for Sri Lanka that we could verify was the sighting of a first cycle CIFR at Arripu on 27 May 2010 (Gunawardena 2010). Although the published account contained scant evidence, we verified this record from photographs (**[132]**, sr01).

CIFR has also had a 'revolving door' history on the Indian list, with several purported records added and subsequently removed over many years (see Praveen et al. 2013). CIFR has been listed for the Andaman Islands by several references (e.g. BirdLife International 2001; Nelson 2005; Rasmussen & Anderton 2012), and mapped without comment in several more. Most if not all of these inclusions were based on a sight record at Rangat Bay, Middle Andaman, in November 1989 by Saxena (1994). Saxena identified the bird with the aid of Harrison (1983), using the "white belly and broader breast band" to rule-out LEFR, and "white on [its] axillaries" to rule-out GRFR. Given the complexity of identifying first cycle frigatebirds in the field as evident now, we consider this description inadequate and concur with Praveen et al. (2013) that this record is unsubstantiated. Subsequent reports of CIFR at Ograbraj, South Andaman, in 2014 and/or 2015 (Sivaperuman et al. 2018, 2020) included very few details. Unfortunately, we were unable to verify these reports through our correspondence. Thus, we concur with Praveen et al. (2013) that there are no valid published reports of CIFR from the Andaman and Nicobar Islands.

A first cycle frigatebird found dead at Bashirat, North 24 Parganas District, West Bengal, on 31 May 2006 was the only Indian record accepted by Praveen et al. (2013), and the sole basis for its inclusion on the Indian list at that time. However, Maheswaran & Alam (2014) examined the specimen and concluded that morphometric data and plumage details favour the identification as GRFR over CIFR. We agree with Manna et al. (2024) that this specimen is not a confirmed CIFR.

An unprecedented spate of frigatebird sightings during a six-week period in mid-2014 resulted in five records of CIFR from India (Karuthedathu et al. 2015). They have already been documented with photographs and identification analyses, and we accept these records as valid.

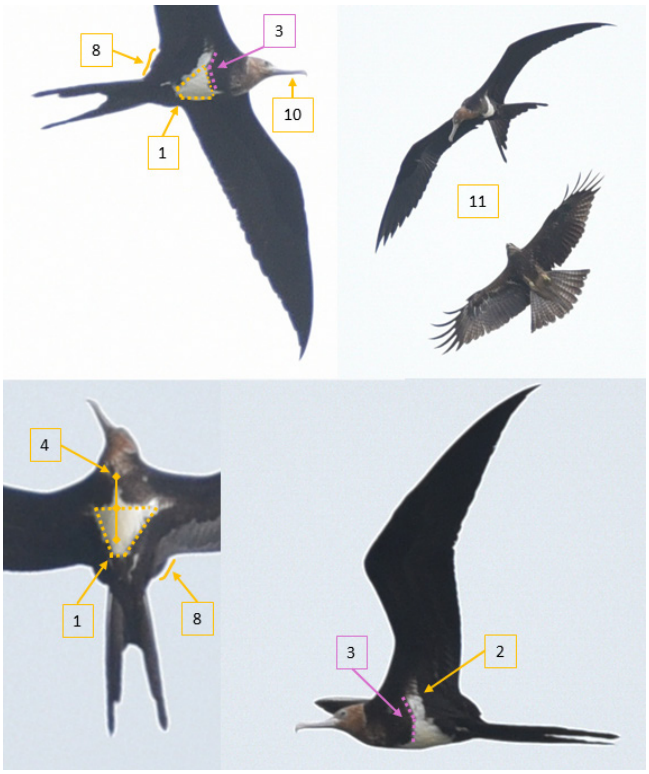
Since 2014, there have been three published records of CIFR from India that we consider to be valid: 1) Outside Chombala Harbour, Kozhikode, in Kerala, a first cycle CIFR was injured when it crashed into a fishing boat on 29 June 2019. The bird was brought ashore for care, where it was photographed and measured, but it did not survive. DJJ provided identification advice from photographs, as outlined in Vishnudattan & Meppayur (2019) and Paleri et al. (2022). The correct date is 29 June, not 30 June 2019 (Paleri et al. 2022; DK; DJJ; contra Vishnudattan & Meppayur 2019); see **[133]** for further details. 2) A first cycle CIFR was photographed at Thakdari, in West Bengal on 21 May 2020, and sighted again the next day. This bird was accepted by Manna et al. (2024—see their supplementary material) as the first valid record for West Bengal. We agree with this identification **[134]**. 3) A second cycle CIFR was photographed near Mahuva, Bhavnagar, in Gujarat on 20 May 2021. DK identified it from photographs, and his reasons were outlined in Bhil & Bhil (2021); see **[135]** for our identification analysis.

Another published record identified as CIFR was based on photographs taken at Kalpakkam Bridge in Tamil Nadu on 2 July 2016 (Balasubramanian 2016). In 2016, DJJ provided an opinion to DK that this was a CIFR. However, our new understanding of plumage characteristics suggests that this bird was actually a LEFR, and can no longer be accepted as a CIFR **[148]**.

Previously unpublished records: A total of 13 previously unpublished records of CIFR from South Asia are summarized in Table 2 and mapped in Fig. 1. Nine of these are from Sri Lanka and four are from India. Nine records are from 2024, with one each from 2008, 2010, 2018, 2020 and 2021.

The earliest verified record from South Asia was at Mutuwal, Colombo, Western Province, Sri Lanka on 31 May 2008 (Table 2, tag 10, **[136]**), whilst the earliest records from India were in 2014 (Karuthedathu et al. 2015; Table 1). In terms of administrative boundaries, the Indian records were from six states and eleven districts, while the Sri Lankan records were from four provinces and five districts (Tables 1 and 2). Illustrative images marked to show identification criteria for the 13 unpublished records and four of the published records of CIFR are shown in photographs **[130–147]**. The locations of all the verified records of CIFR from South Asia are mapped in Fig. 1.

Confirmed records of CIFR occurred in five separate years in Sri Lanka, six years in India, and eight years in total across South Asia. However, almost two-thirds of the records came in just two years (~41% in 2024 and ~23% in 2014). Similar trends were apparent in other frigatebird species in 2024 but not in 2014 (see Supplementary Table 2). All three species of



Udaya Kumar Balasubramanian

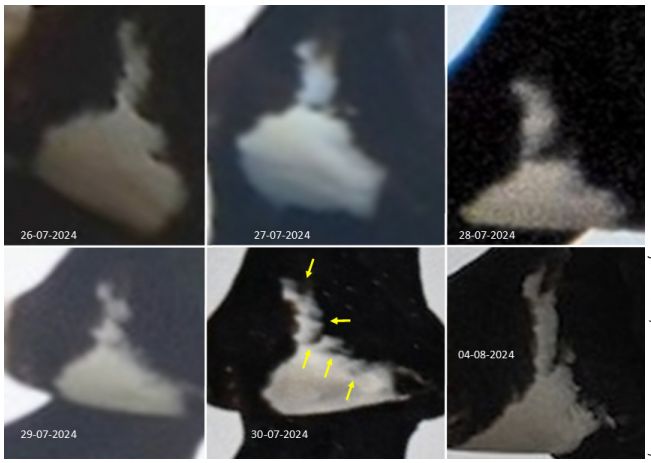
148. Lesser Frigatebird, first cycle from Kalpakkam Bridge, Chengalpattu, Tamil Nadu, India, 02 July 2016. Previously published as a Christmas Island Frigatebird, based on advice from DJJ (Balasubramanian 2016) but no longer considered that species. Identification notes: (1) belly patch generally triangular (allowing for moult in the centre of the breast band) with a narrow rear; (2) spurs are somewhat straplike and angled forward, which contributed to the earlier misidentification; (3) angle between spur and belly patch almost straight (>170°); (4) breast band almost as long as belly patch; (8) humeral arc fairly broad but not very long; (10) short bill; and (11) small size compared to Black Kite.

frigatebirds occurred in most months in South Asia, but showed a clear trend of higher occurrence in the monsoon season (June to September) compared with the pre-monsoon and post-monsoon seasons (Table 3). However, it should be noted that the data were heavily influenced by the 2024 and 2014 influxes.

Table 3. Seasonal trends in the occurrence of frigatebirds in South Asia Records included up to 31 December 2024

	CIFR	LEFR	GRFR	All frigatebirds combined
Observations in pre-monsoon (February-May)	4	5	1	14
Observations in monsoon (June-September)	15	22	11	57
Observations in post monsoon (October-January)	3	7	2	14
Total observations	22	34	14	85

All CIFR records in South Asia have involved single birds so far, although some were with (or loosely associated with) LEFR. At least two different CIFR were recorded around the Colaba Peninsula in Mumbai, Maharashtra, India, between 20 July and 4 August 2024. However, they were never reported together. One of them, a first cycle bird with distinctive identifying marks in its axillary spurs **[149]**, was recorded on seven different days in this period by dozens of observers, but it was never recorded with another CIFR in the area during that period (Table 2, tag 17).



Photos (left to right & top to bottom): Zarine Singh, Neenad Abhang, Yash Kothiala, Krishnan Sivasubramanian, Manjula Desai, and Madhav Murthy

149. This first cycle Christmas Island Frigatebird from Mumbai City, Maharashtra, India (Table 2, #17; the same individual as **[130, 131]**) was seen on multiple dates; multiple black marks encroaching on the spur and belly patch (indicated by arrows) are individually unique to this bird.

Discussion

All of the verified records of CIFR in South Asia have been from the mainland of India and Sri Lanka. They were all from coastal areas, with two exceptions. One exception was *c.* 100 km inland at the large Bhadra Reservoir in the Chikkamagaluru district of Karnataka, India, in 2018 (Table 2, tag 11). The other was from the North 24 Parganas district of West Bengal, India, which is *c.* 100 km inland from the Bay of Bengal, but connected to the coast by the Hooghly River and its large estuary (Table 1, tag 07). All sightings in Sri Lanka and most in India were of birds in their first cycle. In India, however, there was one second cycle bird, one adult male and one adult female. Barring two cases where the birds were observed to be injured or exhausted, all other records involved apparently healthy individuals. At least 12 unique observers sighted CIFR in Sri Lanka, whereas this number was over 60 in India. While CIFRs have been sighted on both the western and eastern coasts of India and Sri Lanka, there are only two records from the east coast of India and one from eastern Sri Lanka (~14%; Fig. 1). This may reflect different observation efforts in different regions (especially in Sri Lanka). Alternatively, it might be a pattern in the movements of CIFR, for example, the southwest Indian monsoon during the summer might push soaring birds closer to western coastlines more so than eastern coastlines.

Several sightings of CIFR in this study included observations of harassment behaviour by other birds. These were by Brahminy Kite *Haliastur indus* (one or two incidents), Black Kite *Milvus migrans* (two incidents), Red-wattled Lapwing *Vanellus indicus* (one incident) and crows *Corvus* sp. (three incidents). A CIFR was also observed to attack a Brahminy Kite, apparently as a response to harassment. Harassment by kites and corvids was also noted in multiple observations of LEFR investigated in this study. Harassment of frigatebirds has not been widely discussed in the literature, as far as we are aware, but Nankeen Kestrel *Falco cenchroides* harasses frigatebirds frequently on Christmas Island (DJJ pers. obs.). This might be a general response to large, soaring, and/or unfamiliar birds, or a specific response to a particular threat, such as the kleptoparasitic behaviour of frigatebirds.

Status in South Asia: There are no historical records of CIFR from India or South Asia (i.e., prior to 01 January 2000, sensu Praveen & Jayapal 2024). Praveen & Jayapal (2024):165 defined

a vagrant as a "species that has been reliably reported in fewer than ten years since 01 January 2000." CIFR has been reported in just eight years in total across South Asia, so it meets this definition of a vagrant. The total of 22 confirmed records in South Asia is low and clustered mainly in two years (~64% in 2024 and 2014 combined). Almost all records (~86%) involved young birds in their first or second cycle, and always involved single birds. By contrast, hundreds of regular reports of CIFR exist from the seas and coastlines of the Sunda Shelf and the Sulu Sea in Southeast Asia consistently across many years (BirdLife International 2001; Jensen & Tan 2010; James & McAllan 2014). These typically involve a mix of all age classes, often in flocks (Jensen & Tan 2010; Tirtaningtyas & Hennicke 2015; DJJ unpubl. data). Records become sparser with increasing distance from the Sunda Shelf in all directions, other than at Christmas Island itself (James & McAllan 2014).

When not attending their sole breeding island, most CIFRs 'camp' at non-breeding roost islands for extended periods, where they forage by day and return to roost at night (James & McAllan 2014; Hennicke et al. 2015). This is seemingly a specialized form of central place foraging (sensu Orians & Pearson 1979). Thirteen such islands were listed by James & McAllan (2014), all of which are in Southeast Asia. The nearest known roost island to South Asia is in the Phi Phi Islands (7.655°N, 98.765°E) on the west coast of Thailand, only 550 km east of the Nicobar Islands. By contrast, there are no verified records of CIFR from the Andaman and Nicobar Islands. No roost islands have been located anywhere in South Asia, even though there are four large archipelagos (Andaman and Nicobar, Chagos, Lakshadweep, and Maldives), and other areas (e.g., along the Bengal coast) with potentially suitable 'camp' sites. These regions are remote and inaccessible, and receive very little bird survey attention. Nevertheless, the available evidence suggests that South Asia is not within the core range of CIFR.

The influxes of CIFR to South Asia in 2014 and 2024 appear to be exceptional events. LEFR and perhaps GRFR showed similar influxes in 2024 but not in 2014. Whilst local conditions might influence such influxes, conditions in more usual parts of the range are likely to have stronger influences, so we have not investigated this issue. The range of dates reported for CIFR sightings in South Asia spanned just six weeks in 2014 (Karuthedathu et al. 2015) and nine weeks in 2024 (Table 2, excepting tag 22), rather than extended seasons. Since frigatebirds never settle on the water voluntarily, they either roost in trees on small, uninhabited islands at night, or stay on the wing for long periods (James & McAllan 2014; Hennicke et al. 2015). CIFRs are not known to use roost islands on an occasional or ad hoc basis, so it seems unlikely that they had local roost sites, although this cannot be ruled out. They will stay on the wing for weeks at a time (Hennicke et al. 2015), but then they travel with the weather systems and are typically transient (Weimerskirch et al. 2003). Although the reasons why CIFR appeared in exceptional numbers in 2014 and 2024 are unexplained, they were more likely being transient than temporarily resident.

These multiple lines of evidence provide a strong indication that the marine waters in South Asia are outside the core range of CIFR, even if they might provide suitable foraging habitat for the species. CIFR is no more than an accidental and transient visitor to South Asia, and is neither a regular nor seasonal migrant here.

Although there are no verified records of CIFR from South Asia prior to 2008, we anticipate that sightings will increase in the future. This will not likely be due to an increased population of CIFR (the population is stable or declining gradually: Macgregor et al. 2021; DJJ unpubl. data). Nor will it require any changes in the species' behaviour or movements, including any responses to climate change. Largely, it will be due to increased interest in seabirds in South Asia, additional funding for coastal bird monitoring, and improvements in tools, including identification resources, and imaging, communication and transport technologies.

An emerging trend for ranking the conservation priority of species is to combine their evolutionary distinctiveness and globally endangered status to provide an EDGE score. EDGE species typically have few close relatives, are unusual in their genetic make-up, appearance and behaviour, and are at high risk of extinction. The extinction of an EDGE species represents a high loss of significant and unique biodiversity. Of the 690 EDGE species of birds in the world, CIFR is one of the priority species (McClure et al. 2023). Considering this, we hope that this study will foster increased interest and provide improved resources for documenting frigatebirds around South Asia in the future.

Acknowledgments

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Author contributions

Conceptualization: PP, DJJ; Methodology: DJJ, PP; Investigation: DJJ, PP, DK, MK, LW, GdSW; Identification: DJJ; Data curation: DJJ, PP, DK, MK; Writing – Original draft: DJJ, PP; Writing – Review & editing: DJJ, PP, DK, MK, LW, GdSW; Mapping: PP; Photograph annotation: DJJ

References

Ali, S., & Ripley, S. D., 1983. *Handbook of the Birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. Compact ed. Delhi: Oxford University Press. Pp. i–xlii, 1 l., pp. 1–737, 56 ll.

Balasubramanian, U. K., 2016. Christmas Island Frigatebird at Kalpakkam, Tamil Nadu. *Indian Birds* 12 (4–5): 148A.

Bhil, B. & Bhil, M., 2021. Sighting of Christmas Island Frigatebird *Fregata andrewsi* and Lesser Frigatebird *Fregata ariel* near Mahuva, Bhavnagar. *Flamingo* 14 (2): 9–10.
BirdLife International, 2001. Christmas Island Frigatebird Fregata andrewsi. *Threatened Birds of Asia: The BirdLife International Red Data Book*. Cambridge, UK: BirdLife International: 104–110.
BirdLife International, 2022. *Fregata andrewsi*. *The IUCN Red List of Threatened Species 2022*: e.T22697742A210923623. Webpage URL: https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T22697742A210923623.en. [Accessed on 13 November 2024].
BirdLife South Africa, 2024. BirdLife South Africa Checklist of Birds in South Africa. Webpage URL: https://www.birdlife.org.za/media-and-resources/bird-checklists/. [Accessed on 13 November 2024].
Carr, P., 2015. Birds of the British Indian Ocean Territory, Chagos Archipelago, central Indian Ocean. *Indian Birds* 10 (3&4): 57–70.
Carr, P., 2025. Chagos Archipelago: An ornithological update 2015–2025. *Indian BIRDS* 21 (3): 65–74.
Chalmers, M. L., 2002. A review of frigatebird records in Hong Kong. *Hong Kong Bird Report 1998*: 128–142.
De Silva, R. I., 1990. The seabirds of Sri Lanka: an annotated check-list. *Ceylon Journal of Science (Biological Science)* 21 (1): 28–33.
De Silva, R. I., 2011a. Comments on Sri Lanka's Marine Avifauna with a note on observing the seabird migration. *Sathsamudra* 1: 6–10.
De Silva, R. I., 2011b. Observing oceanic birds in Sri Lanka. *Indian Birds* 7 (3): 58–62.
De Silva, R. I., Kotagama, S. W., Wijayasinha, A. S., & Abeygunwardane, V., 2006. Avifaunal list of Sri Lanka. In: Bambaradeniya, C. N. B. (ed.). *The Fauna of Sri Lanka: Status of Taxonomy Research and Conservation*. Colombo: The World Conservation Union (IUCN) and Government of Sri Lanka: 164–203.
Fisher, D., & Hunter, N., 2016. East African Rarities Committee Report, 2013-2015. *Scopus* 36: 57–64.
Gunawardena, K., 2010. [no title]. *Ceylon Bird Club Notes*. *May* 2010: 96–99.
Harrison, P., 1983. *Seabirds: An Identification Guide.* London: Croom Helm. Pp. 1–448.
Hennicke, J. C., James, D. J., & Weimerskirch, H., 2015. Sex-specific habitat utilization and differential breeding investments in Christmas Island Frigatebirds throughout the breeding cycle. *PLoS One* 10 (6). https://doi.org/10.1371/journal.pone.0129437: e0129437.
Hoffmann, T. W., 1991. [no title]. *Ceylon Bird Club Notes June* 1991: 39.
Howell, S. N. G., 2010. *Peterson Reference Guide to Molt in North American Birds*. New York: Houghton Mifflin Harcourt. Pp. xii, 1–267.
James, D. J., 2003. *A Survey of Christmas Island Frigatebird Nests in 2003*. Christmas Island, Australia: Parks Australia North, Christmas Island: Pp. 1–79, iii.
James, D. J., 2004. Identification of Christmas Island, Great and Lesser Frigatebirds. *Birding Asia* 1: 22–38.
James, D. J., & McAllan, I. A. W., 2014. The birds of Christmas Island, Indian Ocean: A review. *Australian Field Ornithology* 31 (Supplement): S1–S175.
Jensen, A. E. & Tan, J. M. L., 2010. First observation and subsequent records of Christmas Island Frigatebird *Fregata andrewsi* in the Philippines with notes on its occurrence and distribution. *BirdingAsia* 13: 68–70.
Karuthedathu, D., James, D., Sasidevan, A., Moghul, M., Parab, P., Davidson, S. S., Manickam, S., Rao, V., & Vineith, M., 2015. A compilation of frigatebird sightings from 2014, including Christmas Island Frigatebird *Fregata andrewsi*. *Indian Birds* 10 (5): 115–118.
Kotagama, S. W., & De Silva, R. I., 2006. The taxonomy and status of offshore birds (Seabirds) of Sri Lanka. In: Bambaradeniya, C. N. B. (ed.). *The Fauna of Sri Lanka: Status of Taxonomy Research and Conservation*. Colombo: The World Conservation Union (IUCN) and Government of Sri Lanka: 288–293.
Macgregor, N. A., Hennicke, J. C., Bell, E., Brown, S. M., Flakus, S., James, D. J., Woinarski, J. C. Z., Baker, G. B., & Garnett, S. T., 2021. Christmas Island Frigatebird *Fregata andrewsi*. In: Garnett, S.T & Baker, G.B (eds). *The Action Plan for Australian Birds 2020*. Melbourne, Australia: CSIRO Publishing: 225–227.
Maheswaran, G., & Alam, I., 2014. What is the specific identity of the frigatebird *Fregata* sp., in the collection of the Zoological Survey of India, Kolkata, India? *Indian Birds* 9 (4): 97–99.
Mann, C. F., 1986. Christmas Island Frigatebirds *Fregata andrewsi* on the Kenya coast. *Bulletin of the British Ornithologists' Club* 106: 89–90.
Manna, S., Chatterjee, S., Jha, S., Rahut, B., Baidya, K., Das, S., Dutta, M., Banerjee, A. K., Sengupta, S., 2024. A checklist of the birds of West Bengal, India. *Indian Birds* 20 (4): 97–128A.
Marchant, S. & Higgins, P.J. (eds), 1990. *Handbook of Australian, New Zealand & Antarctic Birds Vol. 1, Ratites to Ducks.* Melbourne, Australia: Oxford University Press. Pp. 1–1400.
Marks, J. S., Jännes, H., Sundberg, O., & James, D. J., 2025. Two Christmas Frigatebirds on Socotra in October 2024. *Dutch Birding* 47: 122–124.
McClure, C. J. W., Berkunsky, I., Buechley, E. R., Dunn, L., Johnson, J., McCabe, J., Oppel, S., Rolek, B. W., Sutton, L. J., & Gumbs, R. 2023. Conserving the evolutionary history of birds. *Conservation Biology* 37 (6): e14141. https://doi.org/10.1111/cobi.14141.
McMaster, D., Rayner, T. S. & McMaster, C. A., 2015. Additional records of Christmas Frigatebird *Fregata andrewsi* in the Northern Territory, Australia. *Australian Field Ornithology* 32: 113–117.
Morris-Pocock, J. A., Hennicke, J. C. & Friesen, V. L., 2012. Effects of long-term isolation on genetic variation and within-island population genetic structure in Christmas Island (Indian Ocean) seabirds. *Conservation Genetics* 13: 1467–1481. https://doi.org/10.1007/s10592-012-0390-6.
Nelson, J. B., 2005. *Pelicans, Cormorants and their Relatives, Pelecanidae, Sulidae, Phalacrocoracidae, Anhingidae, Fregatidae, Phaethontidae*. Oxford, UK: Oxford University Press. Pp. xiii, 1–661, 12.
Orians, G. H. & Pearson, N. E., 1979. On the theory of central place foraging. In: Horn, D.J., Mitchell, R.D., & Stairs G.R. (eds.). *Analysis of Ecological Systems*. Columbus, Ohio: Ohio State University Press: 155–177.
Paleri, A., Aju, K. R., & Amal, E. V., 2022. Sighting of the Critically Endangered Christmas Island Frigatebird off Chombala Coast, Kerala. Birdo-soar #111. *Zoo's Print* 37 (3): 46–49.
Phillips, W. W. A., 1978. *Annotated Checklist of the Birds of Ceylon (Sri Lanka).* Revised ed. Ceylon: Wildlife and Nature Protection Society of Sri Lanka. Pp. i–xix, 1–193.
Pittie, A., 2024. Bibliography of South Asian Ornithology. Webpage URL: https://www.zotero.org/groups/5518417/bibliography_of_south_asian_ornithology [Accessed on 31 August 2024].
Praveen J., 2025. *Birds of India: The New Synopsis*. Mysuru: Nature Conservation Foundation. Pp. i–xlvii, 1–468.
Praveen J., Jayapal, R., & Pittie, A., 2013. Notes on Indian rarities–1: Seabirds. *Indian Birds* 8 (5): 113–125.
Praveen J., Jayapal, R., & Pittie, A., 2016. A checklist of the birds of India. *Indian Birds* 11 (5 & 6): 113–172A.
Praveen J., & Jayapal, R., 2024. Taxonomic updates to the checklists of the birds of India and the South Asian region–2025. *Indian Birds* 20 (6): 165–169.
Rasmussen, P. C., & Anderton, J. C., 2012. *Birds of South Asia: the Ripley Guide: Attributes and Status*. 2nd ed. Washington, D.C. and Barcelona: Smithsonian Institution and Lynx Edicions. Vol. 2 of 2 vols. Pp. 1–683.
Saxena, A., 1994. Sighting of Christmas Island Frigate Bird (*Fregata andrewsi* Mathews) in the Andamans. *Journal of the Bombay Natural History Society* 91: 138.
Sivaperuman, C., Gokulakrishnan, G., Rasmussen, P. C., & Parthipan, P., 2018. Avifauna of Andaman and Nicobar Islands with an updated checklist. In: Sivaperuman, C. & Venkataraman, K. (eds). *Indian Hotspots*. Singapore: Springer: 93–136. https://doi.org/10.1007/978-981-10-6983-3_6.
Sivaperuman, C., Gokulakrishnan, G., & Kumar, S. S., 2020. Status and distribution of wetland birds in tsunami inundated wetlands of South Andaman. *Journal of the Andaman Science Association* 25: 70–93.
Tirtaningtyas, F. N., & Hennicke, J. C., 2015. Threats to the critically endangered Christmas Island Frigatebird *Fregata andrewsi* in Jakarta Bay, Indonesia, and implications for reconsidering conservation priorities. *Marine Ornithology* 43: 137–140. http://doi.org/10.5038/2074-1235.43.2.1122.
Vishnudattan, N. K., & Meppayur, S., 2019. Christmas Island Frigatebird *Fregata andrewsi* Mathews from Chombala coast, Kozhikode district, Kerala, India. *Malabar Trogon* 16 (3): 63–66 (2018).
Warakagoda, D., 1992a. Some sightings of frigate-birds in 1991. *Ceylon Bird Club Notes March* 1992: 55–56.
Warakagoda, D., 1992b. [no title]. *Ceylon Bird Club Notes July* 1992: 92.
Weimerskirch, H., Chastel, O., Barbraud, C., & Tostain, O., 2003. Frigatebirds ride high on thermals. *Nature* 421 (6921): 333–334. https://doi.org/10.1038/421333a.