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Cover: Orange Oakleaf *Kallima inachus* with colour pencils and watercolor wash by Elakshi Mahika Molur adapted from a workshop by Lenin Raj.

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COMMUNICATION

From the Arabian Peninsula to Indian shores: Crab Plover *Dromas ardeola* Paykull, 1805 (Aves: Charadriiformes: Dromadidae) breeding at Point Calimere, India

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Abstract: Crab Plover *Dromas ardeola* is endemic to the subtropical and tropical coastlines of the Indian Ocean. It breeds along the eastern coasts of Africa, the Persian Gulf, and southern coasts of the Arabian Peninsula; occurs also in the western Madagascar and most islands northwards to Seychelles. It is a winter visitor to Pakistan, Gujarat, and peninsular India, Andaman & Nicobar Islands, Lakshadweep, northern Sri Lanka, Maldives, and a vagrant to Bangladesh. The objective of this study was to assess the breeding records of the Crab Plover in Point Calimere. After some preliminary surveys and interactions with local birders, between June and August 2023, boat surveys and foot surveys were carried out in the Great Vedaryanam Swamp (GVS) and nearby islets to document the presence of Crab Plover and locate its nests. The presence of five nests of *D. ardeola* was recorded in Manaaran Theevu islet near Siruthalaikkadu of GVS. This observation marks the first documentation of breeding of Crab Plover in the Indian subcontinent. In the context of species conservation within the peninsular Indian region, there is a need for comprehensive and continuous monitoring of breeding sites.

Keywords: Bird migration, breeding colony, nesting site, shorebirds, winter visitor.

Editor: Anonymity requested.

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INTRODUCTION

The Crab Plover *Dromas ardeola,* belonging to the family Dromadidae, is a distinctive and enigmatic species endemic to the subtropical and tropical coastlines of the Indian Ocean. Crab Plovers are winter visitors on the coasts of Pakistan, Gujarat, and peninsular India, Andaman & Nicobar Islands, Lakshadweep, northern Sri Lanka, Maldives, and Bangladesh. Crab Plovers are known to breed on islands in the Arabian Gulf and Africa including the United Arab Emirates, Masirah Island in Oman, Kuwait, Iran, Saudi Arabia, Yemen, Eritrea, Egypt, Sudan, and the islets of northern Somalia (Cramp et al. 1983; De Marchi et al. 2006; Scott 2007; Delany et al. 2009; Jennings 2010; Tayefeh et al. 2011; Javed et al. 2012; Tayefeh et al. 2013; Bom & Al-Nasrallah 2015; Abdelhafez et al. 2020). These birds form colonies and engage in nesting activities from April to August. They lay a single egg within a self-excavated burrow located in a flat sandbank (Morris 1992; Hockey 1995; Rands 1996). The nest is an unlined chamber at the end of a burrow 100–250 cm long excavated into the sandy substrate (Rands 1996). Within these burrows, the female lays a single egg. This nesting strategy provides the necessary protection and safety for the egg during the incubation period and the burrows appear to be useful for partial solar incubation (De Marchi et al. 2008) and extended foraging on the tidal food resource (De Marchi et al. 2015a). The chicks are semi-nidifugous (Cramp et al. 1983; Hockey & Aspinall 1997), and remain within the nest burrow until fledging. It has been found that Crab Plover nests shift annually due to various reasons, like the suitability of the sand bank for digging burrows (Hockey & Aspinall 1997; Chiozzi et al. 2011); easy access to and departure from colony sites that explain the preference for nest sites near to the sea (Cramp et al. 1983) and burrows near the base of shrubs to avoid collapse of nests in loose soil (Bourgeois et al. 2008; Chiozzi et al. 2011). The breeding biology of the Crab Plover incorporates features that are unique among shorebirds. It is the only shorebird that nests in self-dug burrows, the only shorebird that lays a white egg (Rands 1996; Hockey & Aspinall 1997), and the waterbird species known to provide food to its chicks well after the post-reproductive migration and over-wintering (De Sanctis et al. 2005).

While the species was never recorded as a breeder in the Indian subcontinent, a hint of possible breeding has come from the preliminary results of research with satellite-tagged crab plovers. On 16 November 2022, in a talk given by Ms. Guyomini Panagoda, University of Colombo, in the Asian Flyways Collaborative for Waterbirds (AFCoW) platform about the Central Asian Flyway (CAF) and bird migratory pathways in Sri Lanka, mentioned about five Crab Plover individuals being satellite tagged and colour banded for migratory studies (Appendix 1). The findings that were shared on the platform shed more light on the fact that one of the green colour flagged (International colour coding used for Sri Lanka for migratory studies in CAF) and satellite-tagged Crab Plover stayed in the Point Calimere region from June to August 2022 after moving through the Gulf of Mannar (GoM) region of India from Sri Lanka. An attempt was made by the Bombay Natural History Society (BNHS) team in 2022 to trace the same bird, which turned out to be futile. Subsequently, the same male bird was reported with a juvenile on 30 August 2022, in Talai Mannar, Sri Lanka, which further emphasized that the Crab Plover has a potential breeding location at Point Calimere even if earlier studies by the BNHS reported that there has been no Crab Plover record from Point Calimere since 2003 (Balachandran & Thirunavukarasu 2009). The objective of the present study was to find the potential breeding grounds of Crab Plover in the Palk Bay region of Point Calimere.

STUDY AREA AND METHODS

The Great Vedaryanam Swamp (GVS) and its adjacent areas, covering approximately 350 km^2, are situated along the Bay of Bengal, specifically on the low promontory of the Coromandel coast within the Nagapattinam, Thiruvarur, and Thanjavur districts of Tamil Nadu, India. The GVS stretches for about 48 km from east to west, parallel to the Palk Strait and is separated from it by a sandbank. Its extents are about 10 km from north to south, and it is broadest in the east, narrowing to about 8 km in the central part and 6 km at the western end. On the east of the GVS lies the Point Calimere Wildlife Sanctuary known for both migratory and resident bird species. GVS is a coastal wetland featuring a rich diversity of habitats and ecological attributes. These include inter-tidal salt marshes, forested wetlands, mangroves, and brackish to saline lagoons (Image 2 & 3). Additionally, six freshwater inlets connected to the Cauvery River flow into the swamp, contributing to its unique ecosystem, complete with islands and mangrove forests. Notably, the eastern sand dunes within the GVS have largely been stabilized by *Prosopis* vegetation, while the higher dunes in the northeastern region have dense tropical dry evergreen forests. The climate in GVS is characterized by hot and humid summers and rainy winters. Most of

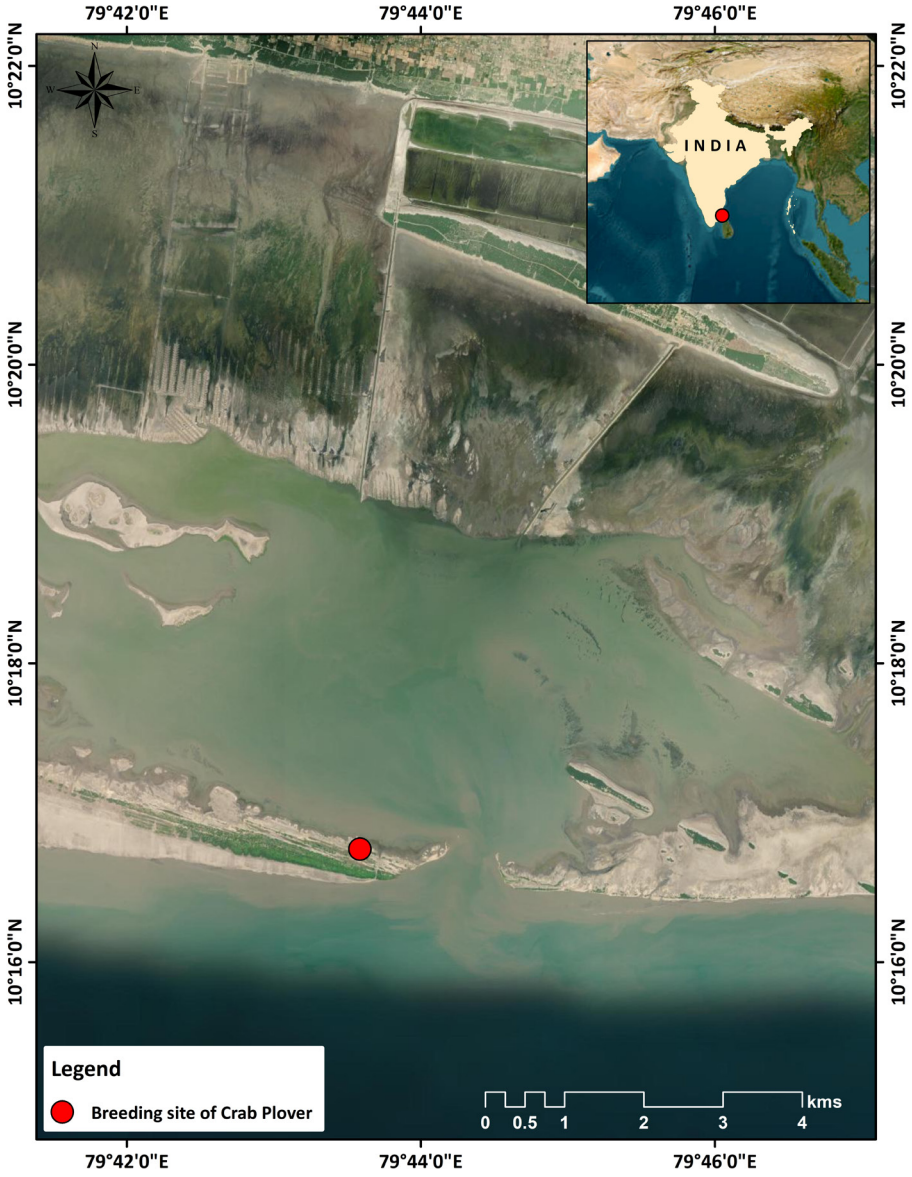

Image 1. The breeding site of Crab Plover in Great Vedaryanam Swamp.

the precipitation occurs during the northeast monsoon season, typically from October to December, contributing to an average rainfall of 1,280 mm in the area. The study area had most of the prey species for Crab Plovers including mudskippers, juveniles of *Portunus portunus,* and Fiddler Crabs (*Uca* spp.) (Balachandran 1995; Byju 2020).

We did some preliminary surveys with birders around the area about frequent visits, sightings, and the presence of Crab Plover from the area for the last two decades. The Crab Plover was regularly documented from Manoli and Hare islands of GoM (Balachandran 1995; Byju 2020), the nearby wintering site on the southeastern coast. With the collected information, we narrowed down the search with three expeditions from June to August 2023 to three islets in the GVS near Siruthalaikadu. Initially, bird surveys were done by boat. Later when the species was located, foot surveys were performed to locate the precise nesting location.

RESULTS

Our observations confirm the breeding records of Crab Plover on Manaaran Theevu (one of the small islets of GVS; 10.2792°N, 79.7264°E), next to the Chellakanni River canal on the southeast coast of India (Image 1). This area is a flat, sandy island with large mudflats extending

Image 2. Habitat of Manaaran Theevu islet in Great Vedaryanam Swamp where Crab Plover breeding was recorded with temporary huts of fishermen.

towards the landmass of Siruthalaikadu. We recorded that the vegetation is entirely composed of grasses and herbs less than 100 cm tall on the edges of the islets towards the landside with intermittent halophytes on the mudflat, along with *Avicennia* mangroves and the invasive *Prosopis juliflora.* On our first survey on 30 June 2023, we counted 13 individuals on the mudflats but could not find any nests. Since as earlier cited, the bird has not been reported from GVS or Point Calimere for more than three decades and this sighting happened during the breeding period. We continued the monitoring to the next month too. The Crab Plover colony was first discovered on 14 July 2023, followed by the next visit on 8 August 2023. On this survey, close to the sea, we identified and documented five nests as a small colony covering a small area of 100–150 m^2 (Image 4 & 5). As we did not want to disturb the nesting, observation was carried out from a safe distance for birds using binoculars (Nikon Monarch7, 10 x 42) and spotting scope (Vanguard HD 82 A).

We could not find any adult-juvenile interaction. We could only spot adult birds near the burrows at times. On 8 August, we recorded some broken egg shells, possibly of Crab Plovers, on the soil surface amid the burrows indicating egg laying (Abdelhafez et al. 2020). We also recorded one green colour flagged bird from Sri Lanka (Image 6 & 7) along with a single juvenile in the August survey on the islet. We could not find any other nesting sites on the nearby islets during the boat surveys.

DISCUSSION

Despite the notable records of Crab Plover breeding in the Arabian Peninsula, the finding of the first confirmed breeding ground in India, well outside the species' primary range, marks a significant discovery. This colony is likely a new one as suggested by the lack of previous records and by the small number of nests, compared to the number of nests in the colonies in the Middle East (Bom & al-Nasrallah 2015). It is interesting to note that the new colony is located in an area with a comparatively high rainfall (on average 1,366 mm) and is therefore more vegetated that the colonies around the Arabian Peninsula (Manikannan et al. 2011; Sathishkumar et al. 2023), but breeding is anyway during the dry season as elsewhere (De Marchi et al. 2015b).

Image 3. The intertidal area and vegetation of the Manaaran Theevu islet with Crab Plovers.

Image 4. Nest of Crab Plover on Manaaran Theevu in Great Vedaryanam Swamp.

Image 5. Closer look of the burrow.

Image 6. Bird (flagged in Sri Lanka, depicted by Green Flag) from the Manaaran Theevu Islet of Great Vedaryanam Swamp observed on 8 August 2023 during the 2023 breeding season.

Image 7. Juvenile bird from Manaaran Theevu Islet observed on 8 August 2023 (during the 2023 breeding season).

While Crab Plover is a 'Least Concern' species as per the IUCN Red List (BirdLife International 2023), their breeding range is notably limited, consisting of only a few colonies, the majority, if not all, of which are located in an area facing rapid exploitation, significant coastal alterations, and pollution (Sheppard et al. 2010; Sale et al. 2011). This environmental context renders the species highly susceptible to threats, as the destruction of a single breeding colony can impact a substantial portion of the overall breeding habitat for the entire population.

Due to our intermittent presence in sight of the breeding colony, we did not record any direct threat, as the collection of eggs by fishermen, which was reported from other nesting sites, like in the Arabian Peninsula (Brown et al. 1991; Rands 1996). We did not record on the breeding islet the presence of dangerous rats and cats (De Marchi et al. 2006; Javed et al. 2012) but we found indirect evidence of the presence of Wild Boar *Sus scrofa* and Golden Jackal *Canis aureus*, which could be a threat to the breeding of this species. An indirect threat we perceived, after informal interaction with the local fishermen community, is the access to outside people for tourism, especially during the hottest months of June and July, which coincide with the breeding time of the Crab Plover. As most of the GVS is not a protected area and the breeding island can't be reached on foot, most of the tourists certainly rent local fishermen's boats in order to illegally spend the whole day on the islets. Moreover, islands are used by fishermen for drying the nets as well as staying for the night for early morning fishing activities. The Crab Plover nesting colonies are found in the vegetated area near the shores where fishermen also land their small fishing vessels, hence the chances of walking over the burrows and the breakages of eggs could happen. Last, as only the eastern tip of the GVS is protected by the Point Calimere Wildlife Sanctuary, the largest part of the insular and intertidal ecosystems of the GVS is threatened by hunting, by the development of salt pans and prawn farms, and by the spread of invasive species like *Prosopis juliflora.* The result is a significant decrease in avian species diversity and abundance compared to historical records (Rashiba et al. 2022).

Considering the location of the Crab Plover colony of the GVS in relation to the main breeding range of the species, it is important to follow the fate of the colony in the coming years and monitor its increase in size or its eventual demise. If possible, access to this area to tourists and fishermen should be curtailed during the breeding season by the concerned authorities. The information collected will be instrumental in enhancing our understanding of the species' breeding strategies and furthering conservation efforts to ensure the preservation of this unique avian species in its limited range.

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Appendix 1. (The access to AFCoW webpage: https://afcow.org/news/. In case you do not have access to YouTube: https://www.bilibili.com/video/BV1ad4y1b7ZU/?share_source=copy_web&vd_source=c53d6edc8ddb6324ee27fd5fa135ece7 (Timings 26.22-30.37).

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