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Short Communication: Avifauna survey in Bama coastal area of Baluran National Park, East Java, Indonesia

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Abstract. *Siddiq AM, Sulistiyowati H, Setiawan R, Wimbaningrum R, Wahono ND. 2024. Short Communication: Avifauna survey in Bama coastal area of Baluran National Park, East Java, Indonesia. Intl J Trop Drylands 8: 14-20.* Baluran National Park is an essential habitat for avifauna in the East Java region, Indonesia. We surveyed the avifauna in the Bama coastal area using the line transect method at three stations, including Kalitopo, Bekol-Bama, and Manting. During a three-day survey, we recorded 53 bird species belonging to 47 genera and 32 families. According to the IUCN Red List, there are three conservation statuses (least concern: 49 species, near threatened: one species, endangered: three species); then, based on the CITES status, there are two categories (non-appendix: 47 species, Appendix II: six species), and finally, based on national status, there are two categories (non-protected categories: 41 species, protected categories: 12 species). Based on the frequencies, 32 common and 21 rare bird species are reported in the Bama coastal area. Three of the common species are Sunda Pied Fantail (*Rhipidura javanica*), Cave Swiftlet (*Collocalia linchi*), and Oriental Pied Hornbill (*Anthracoceros albirostris*), which was found in all observation tracks. Furthermore, these surveys provide recommendations for further research related to ecological topics for several threatened bird species, such as *Padda oryzivora*, *Pavo muticus*, *Acridotheres melanopterus*, *Gracula religiosa*, *A. albirostris*, and *Nisaetus cirrhatus*.

Keywords: Avifauna, Baluran National Park, Bama coastal

INTRODUCTION

Baluran National Park (BNP) is one of the prominent conservation areas with high bird diversity in East Java, Indonesia. Approximately 225 bird species inhabit the natural ecosystems in this area, such as tropical rainforest, monsoon forest, savanna, mangrove forest, and coastal forest (Winnasis et al. 2011). This ecosystem variety also provides several habitats used by bird communities (avifauna). Its conditions provide the resources birds need as food sources, mating sites, nesting sites, and protection sites (Sumaila et al. 2020; Tu et al. 2020), especially for birds with a limited distribution range and are threatened with extinction. Several endemic bird species are also found in BNP, including eight endemic birds for Java-Bali (*Loriculus pusillus, Glaucidium castanopterum, Halcyon cyanoventris, Psilopogon javensis, Hydrornis guajanus, Stachyris melanothorax, Orthotomus sepium, Padda oryzivora*) and three birds species endemic for Java (*Nisaetus bartelsi, Centropus nigrorufus, Macronous flavicollis*) (Winnasis et al. 2011). Furthermore, according to The International Union for Conservation of Nature's (IUCN) Red List of Threatened Species (IUCN 2023), there are 17 bird species in the threatened category, including 7 near threatened species (*Esacus neglectus, L. pusillus, P. javensis, Turdinus macrodactylus, Ploceus hypoxanthus, Ciconia episcopus, Ducula aenea*), 6 vulnerable species (*Buceros rhinoceros, Fregata andrewsi, Egretta eulophotes, Leptoptilos javanicus, C. nigrorufus, Mulleripicus pulverulentus*), and 4 endangered species (*N. bartelsi, Pavo muticus, Acridotheres melanopterus, P. oryzivora*). These birds are distributed in several potential BNP habitats, including the Bama coastal forest.

Bama Coastal is one of the diversity hotspot areas for avifauna in BNP. According to Winnasis et al. (2011), which is the latest report from BNP, there are several endemic and protected birds inhabiting this area, such as *P. muticus, B. rhinoceros, M. pulverulentus, A. melanopterus, C. episcopus* and *L. javanicus*. Geographically, this area is located on the eastern side of BNP, and it includes Bama Resort management. This area has two types of forest ecosystems: mangrove and coastal. Hariyanto et al. (2019) reported that there are 6 mangrove species in Bama, including *Rhizophora stylosa, Rhizophora mucronata, Rhizophora apiculata, Bruguiera gymnorhiza, Ceriops tagal*, and *Nypa fruticans*.

Meanwhile, the vegetation composition and structure of the coastal forest at Bama are still lacking. The forest's existence at Bama is essential in supporting bird diversity in this area. The forest provides several resources that avifauna need, like food, shelter, nesting sites, and socialization areas. According to Graells et al. (2022), the coastal area is a significant bird habitat, affecting the high diversity of bird species. Furthermore, revegetation in

BNPcoastal areas enhances bird diversity, as in Socorejo, Tuban, East Java (Lestari et al. 2017). Therefore, the vegetation in coastal forests influences the existence of avifauna in those areas, including Bama.

Periodic studies of avifauna in Bama are still very limited, at least the last report in 2009 (Widodo 2009) and 2011 (Winnasis et al. 2011). Data updating is needed to determine the existence of birds in their natural habitat, including in this natural park. These data are significant information for bird monitoring in Baluran National Park, particularly those with threatened conservation statuses. On the other hand, birds also have sensitivity to the environment, including human activities (Alexandrino et al. 2016). Hence, the richness and abundance of avifauna in an area have the potential to change every period.

Furthermore, the Bama coastal area is being developed as a tourist destination. Therefore, tourists periodically come to this area (Nuzula et al. 2017), potentially threatening the birds on the Bama coast. Periodic monitoring or avifauna surveys can be set up in several potential areas in Bama. These results can be considered for managing conservation areas, especially in utilization zones such as tourism. Further, the potential hotspots of bird diversity in the Bama area can be developed into birdwatching area options for researchers, observers, or tourists.

MATERIALS AND METHODS

Study area

The study was conducted from 5 to 7 May 2023 in the Bama coastal area of BNP, Indonesia (Figure 1). Data collection was done using line transect (Bibby et al. 2000; Thunhikorn et al. 2016) in three stations (St) including St. Manting (7°50'41.21"S; 114°27'34.96"), St. Kalitopo (7°50'24.69"S; 114°27'45.99"), and St. Bekol-Bama (7°50'42.33"S; 114°27'18.32"). Furthermore, 2-3 observers walk from the starting point (coordinates) through the existing line transect for 500-700 m. These surveys were conducted in the morning (05.30-09.00 AM) and were considered peak ecological bird activities (Thunhikorn et al. 2016; Siddiq et al. 2023).

Bird observations were based on morphological sightings and vocalizations. The equipment was also used for this observation, such as a DSLR camera (Canon EOS 60D), a telephoto lens (300 mm), a binocular (Nikon Aculon), a voice recorder by the BirdNET application (https://birdnet.cornell.edu/), and a stationary note. Ecological data were collected, including bird species, abundance, and frequencies. We used a guidebook for species identification of birds in Greater Sundas (MacKinnon et al. 2010; Taufiqurrahman et al. 2022) and the XenoCanto website (https://xeno-canto.org/) for recording verification. Furthermore, frequencies were determined using Common (recorded in two to three observation tracks with minimal two-day encounters) and Rare (recorded in one observation track with a one-day encounter). Furthermore, the conservation status of each species was collected through three statuses, i.e., The International Union for Conservation of Nature's (IUCN) Red List of Threatened Species (https://www.iucnredlist.org/), Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora (https://cites.org/eng), and National Regulation (*Peraturan Menteri Lingkungan Hidup dan Kehutanan* Number P.106/MENLHK/SETJEN/KUM.1/12/2018).

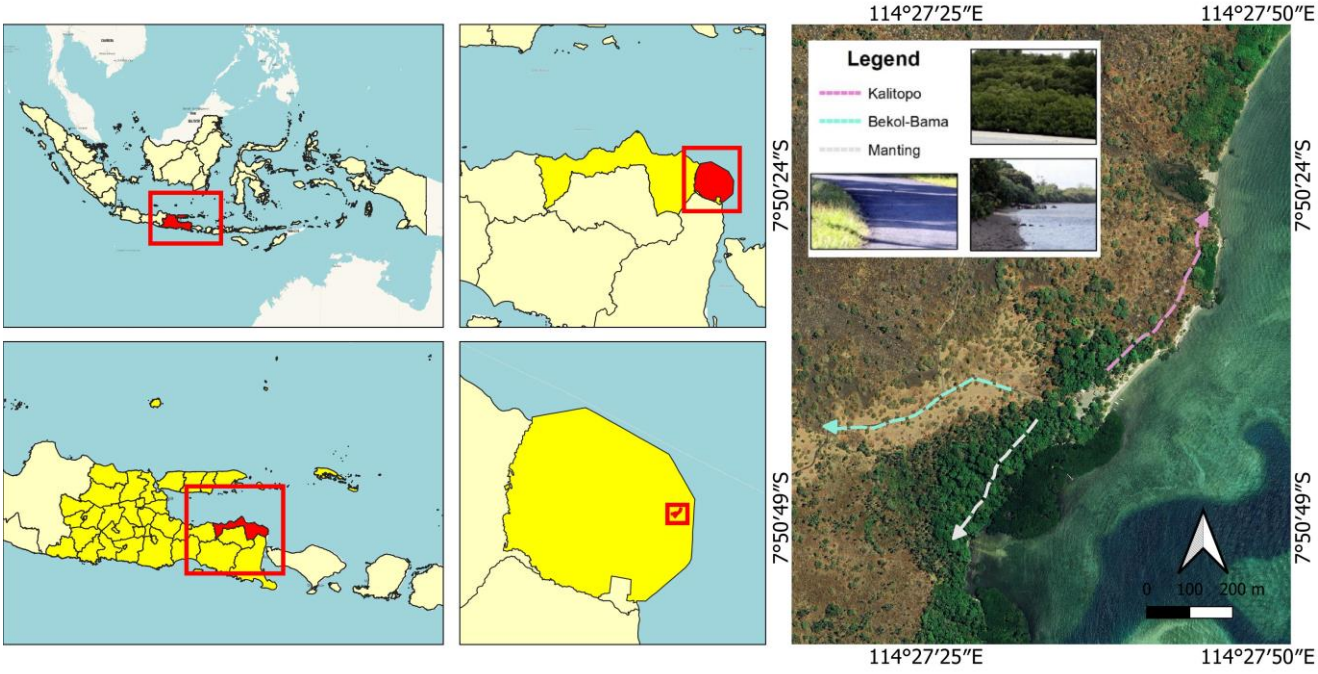

Figure 1. Study sites for avifauna survey at Bama coastal area, Baluran National Park, East Java, Indonesia

RESULTS AND DISCUSSION

The surveys recorded 53 bird species belonging to 47 genera and 32 families in the Bama coastal area of BNP (Table 1). There are 50 species also reported by Winnasis et al. (2011) in BNP; however, three species (*Orthotomus ruficeps, Dicaeum trigonostigma, Gracula religiosa*) have been confirmed by this survey. A late report by Winnasis et al. (2011) revealed that these species were unconfirmed in Baluran National Park. Common Hill Myna (*G. religiosa*) was one of the important findings in this survey, as this species has been protected under the Ministry of Forestry and Environment of Republic Indonesia Regulation No. P.106/MENLHK/SETJEN/KUM.1/12/2018. A single individual was recorded perching on the top canopy of *Corypha utan* with calling activity (Figure 2). Taufiqurrahman et al. (2022) revealed that this species is solitary, in pairs, or in small groups (<10 individuals) and perches on open twigs at the top of tall trees or foraging at fruiting trees.

This survey also reported two species of migratory birds, i.e., Arctic Warbler (*Phylloscopus borealis*) (Figure 2) and tern (*Sterna* sp.). Species *P. borealis* were also reported in BNP during the September-January migratory season (Winnasis et al. 2011). This species breeds across the northern Palaearctic and northwesternmost Nearctic, then migrates to Southeast Asia, the Philippines, and Indonesia (Alstrom et al. 2011). This species was observed solitary with forage activity in the low-medium stratification of the Bama coastal forest. Taufiqurrahman et al. (2022) stated that this species is a common migratory bird in the Greater Sunda, with stopover sites in hilly forests, forest edges, plantations, and parks. Meanwhile, *Sterna* sp. was seen flying in groups (12-16 individuals) in the intertidal-subtidal zone area at Bama, and unclear characteristics were observed for the species. Previous reports stated that there are six tern species, such as Lesser Crested Tern (*Thalasseus bengalensis*), Greater Crested Tern (*Thalasseus bergii*), Little Tern (*Sternula albifrons*), Black-naped Tern (*Sterna sumatrana*), Gull-billed Tern (*Gelochelidon nilotica*), and Whiskered Tern (*Chlidonias hybrida*) in BNP. However, those found on the Bama coast are black-napped and greater crested terns (Winnasis et al. 2011).

Based on the frequencies, 32 common and 21 rare bird species are reported in the Bama coastal area. One common species is the Sunda Pied Fantail (*R. javanica*), found in all observation tracks (Figure 2). This species is found solitary or in pairs with social activities and moving from several trees such as *Syzygium polyanthum, Thespesia populnea*, and *Rhizopora apiculata*. This species is a common bird in coastal areas, mangroves, and plantations of up to 1,500 masl (Taufiqurrahman et al. 2022). In the north of Badung, Bali (Indonesia), this species is common in plantations, forest edges, and riparian areas (Yuni et al. 2022a).

Furthermore, Cave Swiftlet (*C. linchi*) is a common species in this area; this species is indeed very common in Java and Bali, with a wide distribution from lowland to highland forest habitats (Taufiqurrahman et al. 2022). Siddiq et al. (2023) also reported that this species is common in the highlands of Erek-erek Geoforest, Mount Ijen. In the Bama coastal area, *C. linchi* was found in flight activities, with an abundance ranging from 12-25 individuals in each encounter.

The Oriental Pied Hornbill (*A. albirostris*) was also a common species in the Bama coastal area (Figure 2). This species was observed in groups of 3-8 individuals and occupied the coastal forest, particularly in *Ficus variegata* and *C. utan* vegetation. We also recorded this species foraging on fruits at both tree species. A previous report also revealed that *A. albirostris* used *F. variegata* and *C. utan* for foraging behavior in the Bama coastal area (Nurdiansyah et al. 2023). As a member of the Bucerotidae, this species was also reported to be a frugivore bird, especially feeding on some fruits of *Ficus*. However, it has also been reported to experience adaptive predation, preying on farmed edible bird nests of Swiftlet (*Aerodramus* spp.) in Kalabakan, Sabah, Malaysia (Chong et al. 2022).

On the other hand, the Great-Billed Heron (*Ardea sumatrana*) is a waterbird species that is a common category in the Bama coastal area. This species was found as a single individual in the intertidal zone during low tide periods (Figure 2). Sometimes, *A. sumatrana* observed foraging activity and caught several small fish. Taufiqurrahman et al. (2022) revealed that this species inhabits coastal areas, rubbles, and mangrove forests. This species is usually solitary for forage coral fish in the intertidal zone.

Several birds with important conservation status also occupy the Bama coastal area. There 12 bird species are nationally protected (*Gerygone sulphurea, Spilornis cheela, N. cirrhatus, A. sumatrana, A. albirostris, Crypsirina temia, P. oryzivora, Microhierax fringillarius, P. muticus, R. javanica, A. melanopterus,* and *G. religiosa*) found in this area. Furthermore, according to IUCN Red List status, one near-threatened species (*D. aenea*) and three endangered species (*P. oryzivora, P. muticus,* and *A. melanopterus*) were also recorded. Meanwhile, based on CITES status, six species are in the Appendix II category (*S. cheela, N. cirrhatus, A. albirostris, P. oryzivora, P. muticus,* and *M. fringillarius*) in the Bama coastal area. Therefore, considering these results, this area is an essential habitat for threatened birds in Baluran National Park.

The Green Peafowl (*P. muticus*) is a member of the Phasianidae that has an endangered category and protected status in Indonesia. The species is threatened by hunting, trade, and habitat destruction (Birdlife International 2018). In the Bama area, *P. muticus* was recorded to commonly occupy the forest floor of coastal forests, especially those bordering the Bekolsavannah. A previous study revealed that the habitat characteristics of Javan green peafowl in Baluran and Alas Purwo National Park were composed of open areas such as savannah or feeding grounds (Hernowo et al. 2018). Furthermore, black-winged myna (*A. melanopterus*) is globally endangered. This species is a member of the Sturnidae that has a limited distribution in Java-Bali. In this survey, five individuals of *A. melanopterus* were observed flying across the border of the Bama coastal forest and Savannah area (Figure 2). Currently, this species has remaining habitats in conservation areas. Subspecies *A. melanopterus* tricolor is endemic to East Java, and it is only distributed in the tropical savanna landscape of conservation areas in East Java (Sadanandan et al. 2020; Taufiqurrahman et al. 2022).

Table 1. Species composition of avifauna in the Bama coastal area, BNP, Indonesia

Family	Species	Common Name	FS	Status		
				IUCN	CITES	NS
Acanthizidae	*Gerygone sulphurea* (Wallace, 1864)	Golden-bellied Gerygone	R	LC	NA	PR
Accipitridae	*Spilornis cheela* (Latham, 1790)	Crested Serpent-eagle	C	LC	A.II	PR
	Nisaetus cirrhatus (Gmelin, 1788)	Changeable Hawk-Eagle	R	LC	A.II	PR
Aegithinidae	*Aegithina tiphia* (Linnaeus, 1758)	Common lora	C	LC	NA	NP
Alcedinidae	*Halcyon cyanoventris* (Vieillot, 1818)**	Javan Kingfisher	C	LC	NA	NP
	Alcedo coerulescens Vieillot, 1818 *	Cerulean Kingfisher	R	LC	NA	NP
	Ceyx erithaca (Linnaeus, 1758)	Oriental Dwarf-kingfisher	R	LC	NA	NP
	Todiramphus chloris (Boddaert, 1783)	Collared Kingfisher	C	LC	NA	NP
Apodidae	*Collocalia linchi* (Horsfield & F.Moore, 1854)	Cave Swiftlet	C	LC	NA	NP
Ardeidae	*Ardea sumatrana* (Raffles, 1822)	Great-billed Heron	C	LC	NA	PR
Bucerotidae	*Anthracoceros albirostris* (Shaw, 1808)	Oriental Pied Hornbill	C	LC	A.II	PR
Campephagidae	*Lalage nigra* (J.R.Forster, 1781)	Pied Triller	C	LC	NA	NP
	Pericrocotus cinnamomeus (Linnaeus, 1766)	Small Minivet	C	LC	NA	NP
Caprimulgidae	*Caprimulgus affinis* (Horsfield, 1821)	Savanna Nightjar	C	LC	NA	NP
Cisticolidae	*Orthotomus ruficeps* (Lesson, 1830)	Ashy Tailorbird	R	LC	NA	NP
	Orthotomus sutorius (Pennant, 1769)	Common Tailorbird	C	LC	NA	NP
Columbidae	*Streptopelia bitorquata* (Temminck, 1809)	Sunda Collared-dove	C	LC	NA	NP
	Ducula aenea (Linnaeus, 1766)	Green Imperial-pigeon	C	NT	NA	NP
	Treron griseicauda Bonaparte, 1855 *	Grey-cheeked Green-pigeon	C	LC	NA	NP
	Geopelia striata (Linnaeus, 1766)	Zebra Dove	C	LC	NA	NP
	Spilopelia chinensis (Scopoli, 1786)	Eastern Spotted Dove	C	LC	NA	NP
Corvidae	*Crypsirina temia* (Daudin, 1800)	Racket-tailed Treepie	R	LC	NA	PR
Cuculidae	*Cacomantis merulinus* (Scopoli, 1786)	Plaintive Cuckoo	C	LC	NA	NP
Dicaeidea	*Dicaeum trigonostigma* (Scopoli, 1786)	Orange-bellied Flowerpecker	R	LC	NA	NP
	Dicaeum trochileum (Sparrman, 1789) *	Scarlet-headed Flowerpecker	C	LC	NA	NP
Dicruridae	*Dicrurus macrocercus* Vieillot, 1817	Black Drongo	R	LC	NA	NP
	Dicrurus paradiseus (Linnaeus, 1766)	Greater Racquet-tailed Drongo	R	LC	NA	NP
Estrildidae	*Padda oryzivora* (Linnaeus, 1758) *	Java Sparrow	C	EN	A.II	PR
	Lonchura leucogastroides (Moore, 1858) *	Javan Munia	C	LC	NA	NP
	Lonchura punctulata (Linnaeus, 1758)	Scaly-breasted Munia	C	LC	NA	NP
Falconidae	*Microhierax fringillarius* (Drapiez, 1824)	Black-thighed Falconet	R	LC	A.II	PR
Hirundinidae	*Hirundo javanica* (Sparrman, 1789)	Pacific Swallow	C	LC	NA	NP
Laniidae	*Lanius schach* (Linnaeus, 1758)	Long-tailed Shrike	R	LC	NA	NP
Laridae	*Sterna* sp.	Tern	R	LC	NA	NP
Megalaimidae	*Psilopogon haemacephalus* (P.L.S.Müller, 1776)	Coppersmith Barbet	C	LC	NA	NP
Nectariniidae	*Chalcoparia singalensis* (Gmelin, 1789)	Ruby-cheeked Sunbird	R	LC	NA	NP
	Anthreptes malacensis (Scopoli, 1786)	Brown-throated Sunbird	C	LC	NA	NP
	Cinnyris jugularis (Linnaeus, 1766)	Olive-backed Sunbird	C	LC	NA	NP
Pellorneidae	*Malacocincla sepiaria* (Horsfield, 1821)	Horsfield's Babbler	C	LC	NA	NP
Phasianidae	*Pavo muticus* (Linnaeus, 1766)	Green Peafowl	C	EN	A.II	PR
	Gallus varius (Shaw, 1798) *	Green Junglefowl	C	LC	NA	NP
Phylloscopidae	*Phylloscopus borealis* (J.H.Blasius, 1858)	Arctic Warbler	R	LC	NA	NP
Picidae	*Dinopium javanense* (Ljungh, 1797)	Common Flameback	R	LC	NA	NP
	Dendrocopos analis (Bonaparte, 1850)	Freckle-breasted Woodpecker	C	LC	NA	NP
Pycnonotidae	*Pycnonotus plumosus* (Bonaparte, 1850)	Olive-winged Bulbul	R	LC	NA	NP
	Pycnonotus aurigaster (Vieillot, 1818)	Sooty-headed Bulbul	C	LC	NA	NP
	Pycnonotus goiavier (Scopoli, 1786)	Yellow-vented Bulbul	C	LC	NA	NP
Rhipiduridae	*Rhipidura javanica* (Sparrman, 1788)	Sunda Pied Fantail	C	LC	NA	PR
Scolopacidae	*Actitis hypoleucos* (Linnaeus, 1758)	Common Sandpiper	C	LC	NA	NP
Sturnidae	*Acridotheres melanopterus* (Daudin, 1800) **	Black-winged Myna	R	EN	NA	PR
	Gracula religiosa (Linnaeus, 1758)	Common Hill Myna	R	LC	NA	PR
Timaliidae	*Mixornis flavicollis* (Bonaparte, 1850) ***	Grey-cheeked Tit Babbler	R	LC	NA	NP
Vangidae	*Hemipus hirundinaceus* (Temminck, 1822)	Black-winged Flycatcher-shrike	C	LC	NA	NP

Note: FS: Frequency Status, LC: Least Concern, NT: Near Threatened, EN: Endangered, NA: Not Appendix, A.II: Appendix II, NR: National Status, PR: Protected, NP: Not Protected. *: Endemic to Indonesia, **: Endemic to Java-Bali, ***: Endemic to Java, Indonesia (Taufiqurrahman et al. 2022)

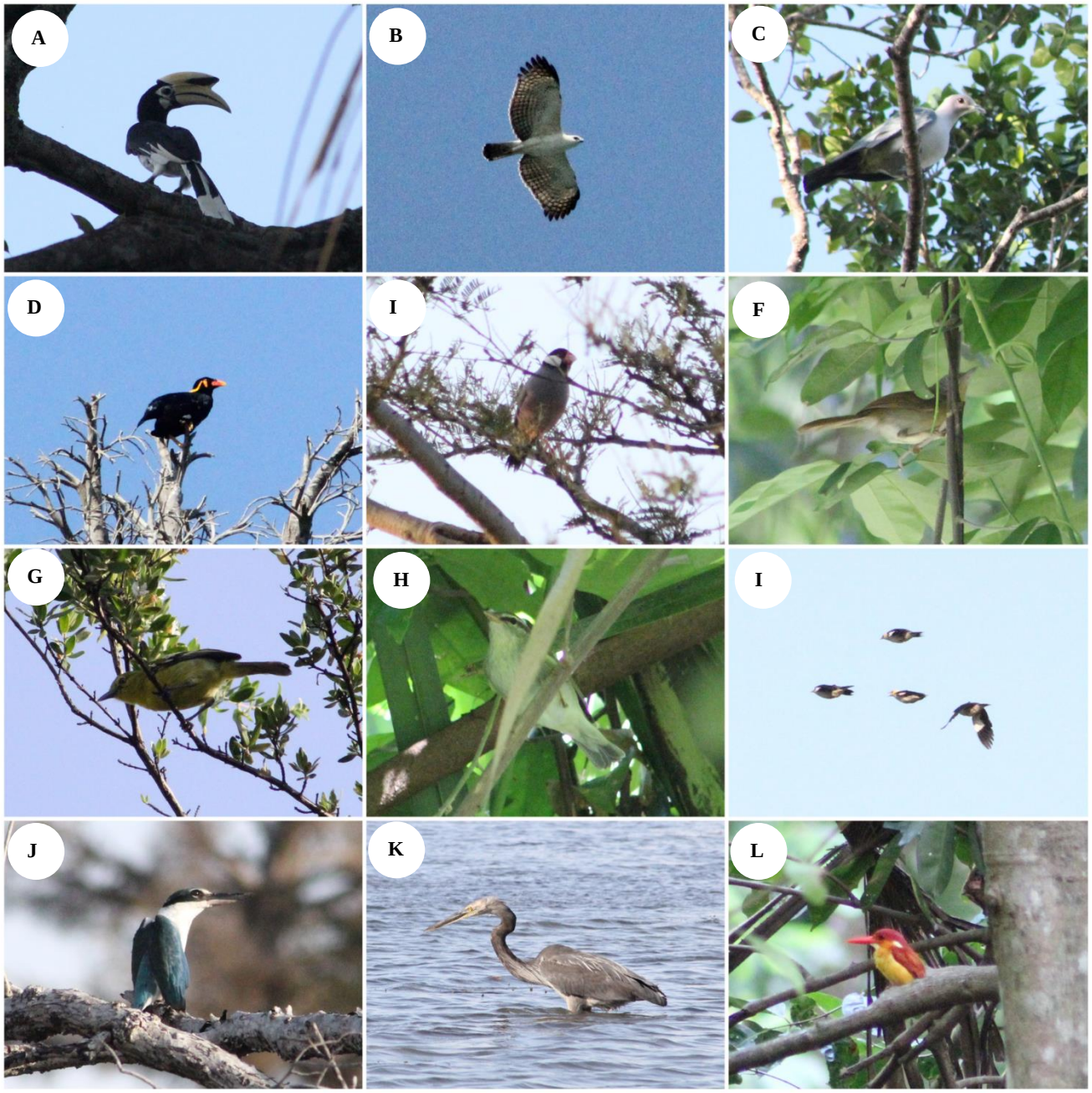

Figure 2. Bird documentation from the Bama coastal area of BNP, Indonesia. A. Oriental Pied Hornbill, B. Changeable Hawk-Eagle, C. Green Imperial-pigeon, D. Common Hill Myna, E. Java Sparrow, F. Grey-cheeked Tit-Babbler, G. Common Lora, H. Arctic Warbler, I. Black-winged Myna, J. Collared Kingfisher, K. Great-billed Heron, L. Oriental Dwarf-kingfisher

A further threatened species in Bama is the Javan sparrow (*P. oryzivora*) (Figure 2). This species was observed with a small group (8-12 individuals) and was only found in Bekol-Bama tracks. The flocks were observed on the top canopy and flew to the ground. This species is a rare category in the surveys. Winnasis et al. (2011) reported that this species was distributed in the monsoon forest at Labuhan Merak Block, around Bilik-Sijile Beach, Balanan, Talpat, Keramat, Bekol, and even along the Batangan-Bekol road of Baluran National Park. Populations in Baluran tend to be stable; however, globally, their population is significantly declining (Birdlife International 2021) due to the illegal capture of pets (Yuda 2015; Chng and Eaton 2016). Thus, conservation areas like Baluran National Park are one of the most appropriate habitats for this species. In addition, this endangered species also inhabits a transition area of monsoon forest and savannah at Bali Barat National Park (Yuni et al. 2022b).

The surveys also recorded three diurnal raptor species, i.e., Black-thighed Falconet (*M. fringillarius*), Crested Serpent-eagle (*S. cheela*), and Changeable Hawk-Eagle (*N.*

cirrhatus). All raptor species are protected under the Ministry of Forestry and Environment of the Republic of Indonesia Regulation Number P.106/MENLHK/SETJEN/ KUM.1/12/2018. Species *N. cirrhatus* has the least concern status, but its population is experiencing a downward trend (Birdlife International 2020). This species was observed solitary and flying through the mangrove forest at Bama. Based on the documentation results (Figure 2), the species was observed in the light phase. Taufiqurrahman et al. (2022) revealed that this raptor has two color phases: light and dark. The presence of this raptor species indicates the availability of prey in Baluran National Park. In Mudumalai Tiger Reserve in Tamil Nadu, India, *N. cirrhatus* was recorded preying on an Indian grey mongoose (*Herpestes edwardsi*) (Samson et al. 2020). In Gunung Halimun-Salak National Park, West Java, this species was identified as prey, including reptiles (snakes and agamid lizards), birds (white-breasted waterhen or *Amourornis phoenicurus*) and mammals (squirrel) (Gunawan et al. 2017).

Several endemic bird species were also found in this survey. There are six endemic birds to Indonesia (*Alcedo coerulescens, Treron griseicauda, Dicaeum trochileum, P. oryzivora, Lonchura leucogastroides, Gallus varius*), two endemic birds to Java-Bali (*H. cyanoventris, A. melanopterus*), and one endemic bird to Java (*M. flavicollis*) (Table 1). Species *M. flavicollis* is only distributed in Java, from the west to the east (Collar et al. 2022). Taufiqurrahman et al. (2022) revealed that *M. flavicollis* is a member of the Timaliidae family, commonly found in various types of open forests and forest edges, including coastal forests. This species favors dense understory and creeping vegetation and has been recorded feeding on black beetles and small insects (MacKinnon et al. 2010). In the Bama coastal area, this species was observed as a single individual with moving activity in creepers. The *M. flavicollis* is categorized as rare in this area, found only on the Manting track. It was found in the dry coastal forests with semi-dense vegetation cover.

The existence of several endemic birds or those with important conservation values in BNP is essential information for staff or managers. The availability of complete and up-to-date data is crucial in determining conservation area management policies. This conservation area is one of several protected areas in East Java that serves as a natural habitat for several endemic and protected birds. The protected areas contribute measurably to conserving avifauna in several of the world's most diverse and threatened terrestrial landscapes (Cazalis et al. 2020). Citizen science also contributes significantly to monitoring or checking birds in some areas using applications. Using the Burungnesia application by citizen science can provide important information such as bird encounters (especially common categories), their population, and habitats (Winnasis et al. 2018).

Monitoring avifauna in Baluran National Park needs to be done periodically and continuously. It is intended to monitor the existence of birds, especially those with important and protected conservation status. These monitors can be based on scientific expeditions by staff, researchers, or citizen science with simple data collection. More importantly, the results are analyzed and published scientifically to be used as a reference for further research or future studies. According to these survey results, further research can be conducted on several threatened bird species, such as *P. oryzivora, P. muticus, A. melanopterus, G. religiosa, A. albirostris,* and *N. cirrhatus* related to several ecology topics, including population, reproduction, behavior, habitat, distribution, and ecological threats. Thus, the research complements the lacking data and becomes a reference in the sustainable management of threatened birds in Baluran National Park.

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