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**Submission date:** 25-May-2023 11:32AM (UTC+0700)

**Submission ID:** 2101365567

**File name:** 2021\_Biodiversitas\_22\_1\_278-287\_Riefani\_et\_al.\_compressed.pdf (466.56K)

**Word count:** 11546

**Character count:** 63753

## Birds in the west coast of South Kalimantan, Indonesia

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Manuscript received: 29 November 2020. Revision accepted: 23 December 2020.

**Abstract.** Riefani MK, Soendjoto MA. 2021. Birds in the west coast of South Kalimantan, Indonesia. *Biodiversitas* 22: 278-287. There is no comprehensive data on birds in the west coast of South Kalimantan, yet the areas are pressured by human activities, especially the rapidly growing tourism. This study aimed to investigate the diversity of bird species that occurred in the west coast of South Kalimantan and to compare the similarities of bird communities across four villages used as the sampling sites, i.e. Sungai Rasau, Sungai Bakau, Tabanio, and Pagatan Besar. Transect method combined with concentration count method were used to record diurnal bird species and number of individuals in five replications from April to September 2020. The observation area was 100 m from the shoreline toward the sea and 400 m from the shoreline toward the inland along 2 km with observation time was 07.00-11.00 and 16.00-19.00. Shannon Wiener species diversity index (H'), a Dice community similarity index based on the presence or absence of species (ISD), and a community similarity index (modification) based on the number of individuals per species (ISM) were analyzed. In total, there are 101 bird species recorded belonging to 41 families with Sungai Bakau Village has the highest number of species (81 species), while Pagatan Besar Village is the lowest (62 species). Thirty-four species are categorized as waterbirds. Twenty-three species are categorized as migratory birds. In terms of diversity index from highest to lowest are Sungai Bakau (4.04), Sungai Rasau (3.95), Pagatan Besar (3.65), and Tabanio (3.48). The similarity of the ISD community ranges from 0.74-0.84, while the ISM ranges from 0.73-0.90. One case (Sungai Bakau - Tabanio) shows that community similarity based on the number of individuals per species is smaller than based on the presence or absence of species. Based on the protection status following Indonesian government regulation, most (84.16%) birds are categorized as unprotected, while based on the conservation status of IUCN, the majority (91.09%) are Least Concern. The results of this study can be used as baseline information for sustainable management of the area in various aspects, including future research (such as on pest and disease control), tourism (such as bird watching), and education (such as field guide).

**Keywords:** Diurnal bird, diversity, South Kalimantan, similarity, status

### INTRODUCTION

South Kalimantan is one of the five provinces in the main island of Kalimantan (Indonesian Borneo) which has coastlines. The coastlines are located in the southwest, south and east of the province. In more detail, the coastline stretches from the west of the Barito River estuary (administratively included in the Barito Kuala District which borders the Central Kalimantan Province), to the east of the Barito River estuary in Banjar District, to the south to Tanjung Selatan in Tanah Laut District, to the northeast through Tanah Laut District to Pagatan in Tanah Bumbu District, and to the north through Tanah Bumbu District and Kotabaru District to the border with East Kalimantan Province.

Like most coastal ecosystems, the west coast of South Kalimantan also consists of two habitats with different characteristics. The first part is the land/terrestrial habitat, which is located from the shoreline toward the inland. The other part is the beach, which is actually the transition area between land and sea, and is located from the shoreline towards the sea at the lowest tide. The shoreline is a virtual line along the coast which is actually the outermost part of

the vegetated land. This line separates the land from the ocean, which is covered by seawater. The beach is alternately or periodically flooded and not inundated by seawater. When high tide or seawater moves inland, beach either covered with vegetation or non-vegetated (sandy/muddy beaches) appears inundated or even submerged. On the other hand, when the sea recedes or the seawater moves away from the land towards the sea, the beach becomes dry and the vegetation that grows or appears to be growing on dry land and non-vegetated areas (sandy/muddy beaches) is evident. According to the Ramsar Convention Secretariat (2016), beach is classified as wetlands. The Ramsar Convention stated that wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters.

The west coast of South Kalimantan is an interesting area to study its biological resources, especially the diversity of birds (avifauna). There are two rationales for the importance of studying bird diversity in this region. First, there is no comprehensive information on the species

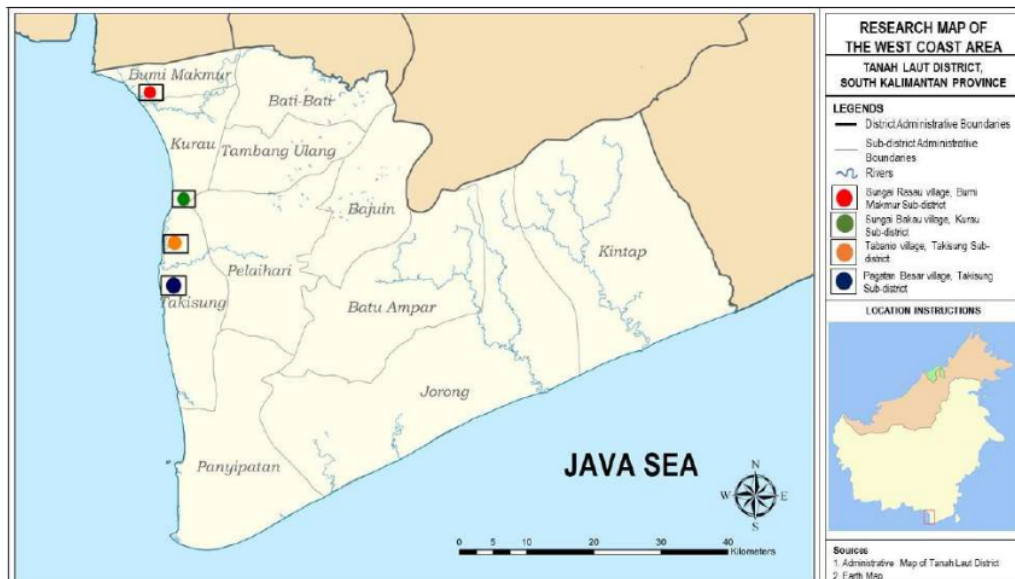
richness of bird in this area although preliminary surveys suggested that there were many bird species occurred on the west coast which can be classified into aquatic and non-aquatic birds. The only research is from Riefani and Arsyad (2019) who reported that among the aquatic birds that occurred in Pagatan Besar Village, there were birds that were categorized as migratory birds. Second, four villages on the west coast of South Kalimantan Province have developed tourism, yet the attracting objects have been merely focused on physical resources. The villages of Tabanio, Takisung, and Batakan, for example, make sandy beaches and seawater as tourism features. One other village, namely Pagatan Besar Village, utilizes mangrove forest as a tourist attraction. However, the growth and development of mangroves, especially api-api or white mangrove (*Avicennia marina*) planted by the community (Soendjoto 2019) hampered activities to observe migratory birds that used to forage on muddy beaches.

This study aimed to investigate the diversity of bird species that occurred in the west coast of South Kalimantan and to compare the similarities of bird communities across four villages used as the sampling sites. We expected the results of this study can be used as baseline information for sustainable management of the area in various aspects, including future research (such as on pest and disease control), tourism (such as bird watching), and education (such as field guide).

**MATERIALS AND METHODS**

**Study area**

Data were collected from four villages in the west coast of South Kalimantan which were directly adjacent to the Java Sea, namely Sungai Rasau, Sungai Bakau, Tabanio, and Pagatan Besar (Figure 1). Detailed information on geographical site and habitat characteristics are presented in Table 1.



**Figure 1.** Map of four research sites located in the west coast of South Kalimantan Province, Indonesia

**Table 1.** Site of data collection, geographical coordinates and habitat characteristics

Site code	Site	Geographical coordinates	Habitat characteristics
SR	Sungai Rasau Village, Bumi Makmur Sub-district, Tanah Laut District	3°33'30"S - 3°34'35"S; 114°34'06"E - 114°34'50"E	Muddy/sandy flat, mangrove forest, coastal forest, fishpond, rice field, grass field, settlements
SB	Sungai Bakau Village, Kurau Sub-district, Tanah Laut District	3°42'26" S - 3°43'48"S; 114°37'01"E - 114°37'34"E	Muddy/sandy flat, mangrove forest, coastal forest, fishpond, rice field, grass field, settlements
TB	Tabanio Village, Takisung Sub-district, Tanah Laut District	3°45'28"S - 3°46'38"S; 114°36'28"E - 114°36'46"E	Muddy/sandy flat, mangrove forest, coastal forest, rice field, grass field, settlements
PB	Pagatan Besar Village, Takisung Sub-district, Tanah Laut District	3°47'56"S - 3°49'08"S; 114°36'14"E - 114°36'32"E	Muddy flat, mangrove forest, grass field (grass height is about 5 cm; this meadow is used as a pasture for livestock), settlements

### Data collection

Data collection was carried out 5 times between April-September 2020 using transect and the concentration count methods. The occurrences of diurnal birds were recorded in an area of 100 m from the shoreline toward the sea and 400 m from the shoreline toward the inland along 2 km twice a day at 07.00-10.00 and 16.00-19.00. Along the transect, we walked slowly while identifying species and counting the number of individuals that were seen directly perching or flying on both sides of the transect within a maximum distance of 100 m if the land was open or 25 m if the vegetation (trees) was dense. In the concentration count method, we stopped at a certain point (in this case at a densely vegetated or forested area that was thought to be a gathering place or a completely open area where the birds gathered together), observed, identified the species, and counted the number of individuals. The tools used were GPS, binocular (8x40), counter and camera with telephoto lens. Birds were identified according to MacKinnon et al. (2010), Soendjoto et al. (2015), or Soendjoto et al. (2019). The taxonomical name was referred to the IUCN (2020).

### Data analysis

The name of bird species and the number of individuals in five replications were tabulated and counted. Then, species diversity and community similarity indices were calculated using the following formula.

Species diversity index Shannon-Wiener;

$$H' = - \sum \frac{n_i}{N} \ln \left( \frac{n_i}{N} \right)$$

Where,  $n_i$  = number of individuals of species  $i$ ;  $N$  = number of individuals of all species;  $\ln$  = natural logarithm.

Community similarity index Dice;

$$IS_D = \frac{2A}{2A+B+C}$$

Modified community similarity index;

$$ISM = \frac{n_i(A+B)}{n_i(A+B) + n_jA + nkB}$$

Where,  $ISD$  = Dice community similarity index calculated based on the presence or absence of species;  $ISM$  = community similarity index whose equation is a modification of the  $ISD$  and the calculation is based on the number of individuals of each species from the communities being compared;  $A$  = number of species present at the two compared sites;  $B$  = number of species present only at the first site;  $C$  = number of species present only at the second site;  $n_i (A + B)$  = the number of individuals of species  $i$  present at site  $A$  and at the same time at site  $B$ ;  $nA$  = number of individuals of species  $j$  only at site  $A$ ; and  $nkB$  = the number of individuals of the  $k$  species that exist only at site  $B$ .

In addition, the status of the bird species protection was determined according to Regulation of the Minister of Environment and Forestry, Republic of Indonesia No. P.106/MENLHK/SETJEN/KUM.1/12/2018 concerning Amendment to Regulation of the Minister of Environment and Forestry No P.20.MENLHK/SETJEN/KUM.1/6/2018 on The Protected Flora and Fauna, while the conservation status assigned according to the IUCN (2020).

## RESULTS AND DISCUSSION

### Species diversity

In the west coast of South Kalimantan, a total of 101 bird species belonging to 41 families were recorded (Table 2). The village of Sungai Bakau has the richest species with 81 species, Sungai Rasau Village with 78 species, Tabanio Village with 62 species, while Pagatan Besar Village is the lowest with 62 species. The sites with the highest to lowest diversity of bird species are Sungai Bakau (4.04), Sungai Rasau (3.95), Pagatan Besar (3.69), and Tabanio (3.48).

**Table 2.** Species name, number of individuals and conservation status of bird at the four study sites in the west coast of South Kalimantan, Indonesian

Family/species	Indonesia name	Internasional name	Number of individuals (n <sub>i</sub> )				Status	
			SR	SB	TB	PB	P.106	IUCN
<b>Acanthizidae</b>								
<i>Gerygone sulphurea</i>	Remetuk laut	Golden-bellied Gerygone	21	24	8	15	TD	LC-d
<b>Accipitridae</b>								
<i>Elanus caeruleus</i>	Elang tikus	Black-winged Kite	5	2	1	1	D	C-s
<i>Haliaeetus leucogaster</i>	Elang laut perut putih	White-bellied Sea-eagle	1	2	1	1	D	LC-d
<i>Haliastur indus</i>	Elang bondol	Brahminy Kite	3	1	1	2	D	LC-d
<i>Nisaetus cirrhatus</i>	Elang brontok	Changeable Hawk-eagle	1	-	-	-	D	LC-i
<b>Acrocephalidae</b>								
<i>Acrocephalus orientalis</i>	Kerakbasi besar	Oriental Reed-warbler	1	-	-	-	TD	LC-d
<b>Aegithinidae</b>								
<i>Aegithina tiphia</i>	Cipoh kacat	Common Iora	25	18	14	20	TD	LC-u
<i>Aegithina viridissima</i>	Cipoh jantung	Green Iora	4	4	8	6	TD	NT-d
<b>Alcedinidae</b>								
<i>Alcedo meninting</i>	Raja-udang meninting	Blue-eared Kingfisher	1	4	1	3	TD	LC-d
<i>Halcyon smyrnensis</i>	Cekakak belukar	White-breasted Kingfisher	4	2	1	-	TD	LC-i
<i>Pelargopsis capensis</i>	Pekaka emas	Stork-bellied Kingfisher	3	3	1	4	TD	LC-d
<i>Todiramphus chloris</i>	Cekakak sungai	Collared Kingfisher	43	18	28	22	TD	LC-d
<i>Todiramphus sanctus</i>	Cekakak suci	Sacred Kingfisher	6	29	12	7	TD	LC-i

<b>Anatidae</b>							
<i>Anas gibberifrons</i>	Itik benjut	Sunda Teal	5	6	-	-	TD NT-s
<i>Dendrocygna arcuata</i>	Belibis kembang	Wandering Whistling-duck	12	15	-	-	TD LC-d
<b>Apodidae</b>							
<i>Apus nipalensis</i>	Kapinis rumah	House Swift	23	20	9	-	TD LC-i
<i>Collocalia linchi</i>	Walet linci	Cave Swiftlet	27	24	21	22	TD LC-d
<b>Ardeidae</b>							
<i>Ardea purpurea</i>	Angang merah	Purple Heron	-	2	-	-	TD LC-d
<i>Ardeola speciosa</i>	Blekok sawah	Javan Pond-heron	24	45	8	9	TD LC-u
<i>Butorides striata</i>	Kokokan laut	Green-backed Heron	7	9	1	5	TD LC-d
<i>Egretta alba</i>	Kuntul besar	Green White Egret	12	4	-	-	TD LC-u
<i>Egretta garzetta</i>	Kuntul kecil	Little Egret	42	10	2	4	TD LC-i
<i>Ixobrychus cinnamomeus</i>	Bambangan merah	Cinnamon Bittern	4	5	1	-	TD LC-s
<i>Ixobrychus sinensis</i>	Bambangan kuning	Yellow Bittern	4	8	1	-	TD LC-u
<b>Artamidae</b>							
<i>Artamus leucorhynchus</i>	Kekep babi	White-breasted Woodswallow	16	14	8	9	TD LC-s
<b>Campephagidae</b>							
<i>Lalage nigra</i>	Kapasan kemiri	Pied Triller	8	6	5	12	TD LC-d
<i>Pericrocotus igneus</i>	Sepah tulin	Fiery Minivet	4	-	-	-	TD NT-d
<b>Caprimulgidae</b>							
<i>Caprimulgus affinis</i>	Cabak kota	Savanna Nightjar	8	13	5	6	TD LC-s
<b>Charadriidae</b>							
<i>Charadrius dubius</i>	Cerek kalung-kecil	Little Ringed Plover	7	62	-	-	TD LC-s
<i>Charadrius leschenaultii</i>	Cerek-pasir besar	Greater Sandplover	9	33	-	85	TD LC-d
<i>Charadrius mongolus</i>	Cerek-pasir mongolia	Lesser Sandplover	-	20	-	20	TD LC-u
<i>Pluvialis fulva</i>	Cerek krenyut	Pacific Golden Plover	-	34	-	27	TD LC-d
<b>Ciconiidae</b>							
<i>Leptoptilos javanicus</i>	Bangau tongtong	Lesser Adjutant	2	1	-	-	D VU-d
<b>Cisticolidae</b>							
<i>Orthotomus ruficeps</i>	Cinenen kelabu	Ashy Tailorbird	23	24	11	16	TD LC-s
<i>Orthotomus sericeus</i>	Cinenen merah	Rufous-tailed Tailorbird	2	-	2	-	TD LC-s
<i>Prinia flaviventris</i>	Prenjak rawa	Yellow-bellied Prinia	8	18	1	6	TD LC-d
<b>Columbidae</b>							
<i>Chalcophaps indica</i>	Delimukan zamrud	Emerald Dove	-	-	4	-	TD LC-d
<i>Geopelia striata</i>	Perkutut jawa	Zebra Dove	3	8	1	5	TD LC-s
<i>Spilopelia chinensis</i>	Tekukur	Eastern Spotted Dove	4	20	2	6	TD LC-i
<i>Treron vernans</i>	Punai gading	Pink-necked Green-Pigeon	4	12	2	6	TD LC-s
<b>Cuculidae</b>							
<i>Cacomantis merulinus</i>	Wiwik kelabu	Plaintive Cuckoo	3	2	3	5	TD LC-s
<i>Cacomantis sonneratii</i>	Wiwik lurik	Banded Bay Cuckoo	-	1	-	-	TD LC-s
<i>Centropus bengalensis</i>	Bubut alang-alang	Lesser Coucal	10	10	3	4	TD LC-i
<i>Centropus sinensis</i>	Bubut besar	Greater Coucal	3	4	3	4	TD LC-s
<i>Chrysococcyx minutillus</i>	Kedasi laut	Little Bronze-cuckoo	1	-	-	-	TD LC-s
<b>Dicaeidae</b>							
<i>Dicaeum trigonostigma</i>	Cabai bunga api	Orange-bellied Flowerpecker	-	-	1	-	TD LC-s
<i>Dicaeum trochileum</i>	Cabai jawa	Scarlet-headed Flowerpecker	9	7	10	8	TD LC-s
<b>Estrildidae</b>							
<i>Lonchura fuscans</i>	Bondol kalimantan	Dusky Munia	10	27	6	5	TD LC-s
<i>Lonchura malacca</i>	Bondol rawa	Tricoloured Munia	12	18	8	8	TD LC-s
<i>Lonchura punctulata</i>	Bondol peking	Scally-breasted Munia	39	13	27	10	TD LC-s
<b>Hirundinidae</b>							
<i>Delichon dasypus</i>	Layang-layang rumah	Asian House-martin	-	-	-	15	TD LC-i
<i>Hirundo tahitica</i>	Layang-layang batu	Tahiti Swallow	15	14	11	10	TD LC-u
<b>Laniidae</b>							
<i>Lanius schach</i>	Bentet kelabu	Long-tailed Shrike	16	20	8	22	TD LC-u
<b>Laridae</b>							
<i>Chlidonias leucopterus</i>	Dara laut sayap putih	White-winged Tern	9	14	-	-	D LC-s
<i>Gelochelidon nilotica</i>	Dara-laut tiram	Common Gull-billed Tern	5	-	-	-	D LC-d
<i>Sterna hirundo</i>	Dara-laut biasa	Common Tern	15	16	15	16	D LC-u
<i>Sterna sumatrana</i>	Dara-laut tengkuk-hitam	Black-naped Tern	7	-	-	-	D LC-u
<i>Sternula albifrons</i>	Dara-laut kecil	Little Tern	-	29	-	-	D LC-d
<i>Thalasseus bergii</i>	Dara-laut jambul	Great Crested Tern	-	34	-	12	D LC-s
<b>Meropidae</b>							
<i>Merops philippinus</i>	Kirik-kirik laut	Blue-tailed Bee-eater	9	13	4	8	TD LC-s
<i>Merops viridis</i>	Kirik-kirik biru	Blue-throated Bee-eater	14	11	31	5	TD LC-s

<b>Motacillidae</b>									
<i>Anthus novaeseelandiae</i>	Apung tanah	Australasian Pipit	1	3	2	3	TD	LC-s	
<i>Motacilla flava</i>	Kicuit kerbau	Western Yellow Wagtail	2	2	1	-	TD	LC-d	
<b>Muscicapidae</b>									
<i>Cyornis rufigaster</i>	Sikatan bakau	Mangrove Blue-flycatcher	-	-	1	1	TD	LC-d	
<b>Nectariniidae</b>									
<i>Aethopyga siparaja</i>	Burung-madu sepah-raja	Crimson Sunbird	2	3	2	1	D	LC-s	
<i>Anthreptes malacensis</i>	Burung-madu kelapa	Brown-throated Sunbird	15	12	11	6	TD	LC-s	
<i>Cinnyris jugularis</i>	Burung-madu sriganti	Olive-backed Sunbird	13	19	14	4	TD	LC-s	
<i>Leptocoma calcostetha</i>	Burung-madu bakau	Copper-throated Sunbird	1	-	-	-	TD	LC-s	
<b>Pandionidae</b>									
<i>Pandion haliaetus</i>	Elang tiram	Osprey	1	-	-	-	D	LC-i	
<b>Passeridae</b>									
<i>Passer montanus</i>	Burung gereja erasia	Eurasian Tree Sparrow	22	21	41	23	TD	LC-d	
<b>Pellorneidae</b>									
<i>Malacocincla sepiaria</i>	Pelanduk semak	Horsfield's Babbler	-	-	2	-	TD	LC-d	
<b>Picidae</b>									
<i>Chrysophlegma miniaceum</i>	Pelatuk merah	Banded Woodpecker	-	-	2	-	TD	LC-s	
<i>Picoides moluccensis</i>	Caladi tilik	Sunda Pygmy Woodpecker	5	5	1	3	TD	LC-i	
<b>Pittidae</b>									
<i>Pitta sordida</i>	Paok hijau	Western Hooded Pitta	-	-	3	-	D	LC-d	
<b>Ploceidae</b>									
<i>Ploceus manyar</i>	Manyar jambul	Streaked Weaver	2	10	-	-	TD	LC-s	
<b>Pycnonotidae</b>									
<i>Pycnonotus aurigaster</i>	Cucak kutilang	Sooty-headed Bulbul	53	61	76	50	TD	LC-d	
<i>Pycnonotus brunneus</i>	Merbah mata merah	Red-eyed Bulbul	15	4	44	2	TD	LC-d	
<i>Pycnonotus goavier</i>	Merbah cerukcuk	Yellow-vented Bulbul	15	34	26	37	TD	LC-i	
<i>Pycnonotus plumosus</i>	Merbah belukar	Olive-winged Bulbul	4	-	4	-	TD	LC-s	
<b>Rallidae</b>									
<i>Amaurornis cinerea</i>	Tikusan alis-putih	White-browed Crane	-	1	-	-	TD	LC-u	
<i>Amaurornis phoenicurus</i>	Kareo padi	White-brested Waterhen	3	9	3	12	TD	LC-u	
<b>Recurvirostridae</b>									
<i>Himantopus leucocephalus</i>	Gagang bayam timur	White-headed Stilt	12	8	-	3	TD	LC-i	
<b>Rhipiduridae</b>									
<i>Rhipidura javanica</i>	Kipasan belang	Sunda Pied Fantail	15	11	13	8	TD	LC-s	
<b>Scolopacidae</b>									
<i>Actitis hypoleucos</i>	Trinil pantai	Common Sandpiper	11	12	3	6	TD	LC-d	
<i>Calidris alba</i>	Kedidi putih	Sanderling	-	40	-	5	TD	LC-u	
<i>Calidris ruficollis</i>	Kedidi leher merah	Rufous-necked Stint	-	41	-	18	TD	NT-d	
<i>Gallinago megala</i>	Berkik rawa	Swinhoe's Snipe	-	-	4	-	TD	LC-u	
<i>Limosa lapponica</i>	Biru laut ekor-blorok	Bar-tailed Godwit	7	13	-	8	TD	NT-d	
<i>Numenius madagascariensis</i>	Gajahan timur	Far Eastern Curlew	-	4	-	7	D	EN-d	
<i>Numenius phaeopus</i>	Gajahan penggala	Whimbrel	-	6	-	-	D	LC-d	
<i>Tringa glareola</i>	Trinil semak	Wood Sandpiper	5	24	-	8	TD	LC-s	
<i>Tringa nebularia</i>	Trinil kaki-hijau	Common Greenshank	-	11	-	-	TD	LC-s	
<i>Tringa stagnatilis</i>	Trinil rawa	Marsh Sandpiper	5	8	-	-	TD	LC-d	
<i>Xenus cinereus</i>	Trinil bedaran	Terek sandpiper	10	23	-	28	TD	LC-d	
<b>Strigidae</b>									
<i>Ketupa ketupu</i>	Beluk ketupa	Buffy Fish-owl	-	2	-	-	TD	LC-s	
<i>Otus lempiji</i>	Celepuk reban	Sunda Scops-owl	-	-	1	-	TD	LC-s	
<b>Sturnidae</b>									
<i>Acridotheres javanicus</i>	Kerak kerbau	Javan Myna	25	55	25	7	TD	VU-d	
<b>Timaliidae</b>									
<i>Mixornis gularis</i>	Ciung-air coreng	Pin-striped Tit-babbler	15	35	7	13	TD	LC-s	
<b>Vangidae</b>									
<i>Hemipus hirundinaceus</i>	Jinjing batu	Black-winged Flycatcher-shrike	-	4	-	1	TD	LC-d	
<b>Zosteropidae</b>									
<i>Zosterops flavus</i>	Kacamata jawa	Javan White-eye	3	-	-	-	TD	EN-d	
<i>Zosterops palpebrosus</i>	Kacamata biasa	Indian White-eye	2	8	-	-	TD	LC-d	
		Number of individuals (N)	817	1242	576	705			
		Number of species (S)	78	81	63	62			
		Species diversity index (H')	3.95	4.04	3.48	3.69			

No. 1) Site of data collection: SR: Sungai Rasau, SB: Sungai Bakau, TB: Tabanio, PB: Pagatan Besar. 2) Protection status according to Minister of Environment and Forestry, Republic of Indonesia No P.106/MENLHK/SETJEN/KUM.1/12/2018 (2018): D: protected, TD: unprotected. 3) Conservation status according to IUCN (2020): EN: endangered, VU: vulnerable, NT: near threatened, LC: least concern, i: increasing, d: decreasing, s: stable, u: unknown

Most (66.34% or 67 species) of the 101 bird species are categorized as non-waterbirds, while the rest (34.66%) are waterbirds. Eight waterbird families in the west coast include of Anatidae, Ardeidae, Charadriidae, Ciconiidae, Laridae, Rallidae, Recurvirostridae, and Scolopacidae, and are among 34 families of waterbirds in the world described by Ducks Unlimited New Zealand (2017) or among 33 families described by Wetlands International (2020).

Twenty-one of 34 waterbird species are categorized as migratory birds, including Greater Sandplover, Lesser Sandplover, Pacific Golden Plover, Little Ringed Plover, Common Gull-billed Tern, Little Tern, White-winged Tern, Great Crested Tern, Common Tern, White-headed Stilt, Far Eastern Curlew, Marsh Sandpiper, Whimbrel, Common Sandpiper, Terek Sandpiper, Wood Sandpiper, Common Greenshank, Swinhoe's Snipe, Sanderling, Rufous-necked Stint, and Bar-tailed Godwit. Based on the colored flag attached to the bird's leg and referring to the meaning of the flag color in EAAFP (2018), R. Yuliansyah (2020, pers. com.) found Sanderling of South Australia on the sandy stretch of the Sungai Bakau, and T.K. Utomo (2020, pers. com.) found Rufous-necked Stint of China-Chongming Island in Pagatan Besar.

Besides the migratory waterbirds, there are also non-waterbirds that are categorized as migrants. They are Osprey, the raptor and Blue-tailed Bee-eater, the insectivore. Osprey has been observed soaring above waters and ponds and then perching on the dry tree of the Sungai Rasau. The presence of Osprey at that site indicates that the migratory raptors (Germi et al. 2009, Bierregaard et al. 2014, Purwanto et al. 2015) or these wetland raptors (Irhani 2012) make the west coast as a stopover site. In the southern hemisphere, these birds that spread around the world become non-breeding visitors in Indonesia (van Balen 1998, Purwanto et al. 2015) as well as breeding visitors in Australia (Clancy 2006; Dennis and Clancy 2014, Detmar and Dennis 2018). Osprey was recorded in February-March 2016 flying around an artificial lake in the Tarjun Cement Factory Area, Kotabaru (Riefani et al. 2019).

Blue-tailed Bee-eater and Blue-throated Bee-eater are migratory birds in Malaysia (Nisbet 2013) and Thailand (DeCandido et al. 2010). There has not been any specific publication on the bee-eaters as migratory birds in Indonesia. According to Soendjoto et al. (2018) and Riefani et al. (2019), Blue-tailed Bee-eater was not always found, while Blue-throated Bee-eater was almost always found in 2013-2017 observations in Tabalong District, South Kalimantan and more than 300 hours of field observation in Kotabaru District, South Kalimantan. Therefore, we only include Blue-tailed Bee-eater as migratory birds and not Blue-throated Bee-eater. Nash and Nash (1985) mentioned Blue-tailed Bee-eater as one of the migratory birds in South Sumatra and do not mention Blue-throated Bee-eater as such.

The following two bird species were also found on the west coast. Both are highlighted in this paper because their presence and distribution are not stated in field books, such as Smythies (1960) and MacKinnon et al. (2010). Therefore, these findings can be considered as new records

that are important for updating data or revising field books. The first is White-breasted Kingfisher which was found in Tanah Laut District, to be precise at Sungai Rasau, Sungai Bakau, and Tabanio. The presence of the bird was observed 9 times, both solitary and 2 individuals, adding to new information that this bird is indeed distributed in Kalimantan Selatan or even Kalimantan in general. Smythies (1960) did not mention the presence of this bird in Borneo. Avibase (2020b) even said that not a single subspecies of White-breasted Kingfisher existed in Indonesia. According to Avibase (2020b), the birds spreading across the Arabian Peninsula to the Caucasus Mountains and the northwestern part of India are *Halcyon smyrnensis smyrnensis*; in West India and Sri Lanka *H.s. fusca*, in the Andaman *H.s. saturator*; as well as in Myanmar to Peninsular Malaysia and Indochina *H.s. perpulchra*. MacKinnon et al. (2010) stated that the distribution of this bird in Sumatra and Java. According to Strange (2012), its distribution was even only in Sumatra. The distribution of White-breasted Kingfisher in Sumatra is supported by the report of Ayat (2011), Arief et al. (2015), Kamal et al. (2016), Santosa et al. (2016), Syamsi (2017), and Iswandaru et al. (2018), while in Java there was the report by Taufiqurrahman et al. (2019). White-breasted Kingfisher was also found in West and South Kalimantan (Myers 2016), industrial plantation companies in West Kalimantan (Ata Marie and Ekologika Consultants 2017), Sebangau National Park, Central Kalimantan (Adi 2018), oil palm plantations in Central Kalimantan (Santosa et al. 2018), and the Liang Anggang Protected Forest Area, Kalimantan Selatan (Wulansari et al. 2020).

The second is Streaked Weaver which was found breeding in Sungai Rasau and Sungai Bakau. In the observations conducted in July 2020, an average of 7.3 nests hung per coconut tree (*Cocos nucifera*) (n = 10) at about 20 m above ground level. More nests (up to 32 nests) were found hanging from branches of the *Acacia auriculiformis* tree at about 6-10 m above ground level. The tree is on the roadside of Sungai Bakau Village. The distribution of Streaked Weaver in Tanah Laut District adds to new record in primary publications. Early records suggest that the distribution of Streaked Weaver in Indonesia is only in Java and Bali (MacKinnon et al. 2010) and not recorded in Borneo (Smythies 1960, MacKinnon et al. 2010). IUCN (2020) said that this bird spreads in Southeast Asia (Cambodia, Myanmar, Singapore, Thailand, Vietnam), South Asia (India, Bangladesh, Bhutan, Nepal, Pakistan, Sri Lanka), China, and even Egypt. Particularly in Indonesia, the map attached to the IUCN report (2020) shows that the distribution of Streaked Weaver is consistent with MacKinnon et al. (2010) mentioned above. According to Avibase (2020a), the Streaked Weaver spreading across Indonesia (the islands of Java, Bali and Bawean) is a subspecies of *Ploceus manyar manyar*; in eastern Pakistan to western India and Sri Lanka *P.m. flaviceps*; in Northeast India (Assam) to Bangladesh and northern Myanmar *P.m. peguensis*; and in Southwest China (Yunnan) to Thailand and Vietnam *P.m. williamsoni*.

The presence of Streaked Weaver in Kalimantan was published by Soendjoto et al. (2014) and Iqbal et al. (2016).

The nests hung from the branches of rambai or mangrove apple (*Sonneratia caseolaris*) and rumbia or sago palm (*Metroxylon sago*) trees. From interviews with the community, Soendjoto et al. (2016) stated that this bird had been detected in Banjar District in 2011. It is likely that the birds were brought by bird traders from Java Island and then accidentally released. Birds can also be deliberately released by keepers who are tired of raising animals or are not careful with raising them after buying them from traders.

In a field trip in 2017, we even found 3 occurrences of this bird with its nest hanging individually on bundung or greater club rush (Cyperaceae: *Scirpus grossus*), one of the swamp plants around Sungai Puting, Tapin Distric. On each stem of 1-1.5 m high there was only one nest attached. In 2018 the weaver's nest was found hanging on a branch of the mangrove apple at a height of about 20 m above the ground in the swamplands of Lambung Mangkurat University, Banjarmasin City. Streaked Weaver is considered to be pests, along with Dusky Munia, Dusky Munia, Scally-breasted Munia, and Eurasian Tree Sparrow because they eat rice grown by the people living in the settlements west of the university campus complex.

It is important to note that the states of the bird species richness and diversity indices are temporary (subject to change) and only apply to this study due to the following reasons. First, this study focuses on diurnal birds, so that nocturnal birds are not observed and identified. Observation and identification of only certain diurnal bird species, for example, those that are small in size and inhabit mangrove forests, coastal forests, or forests with thick canopy cover or those that are migrants, require a longer duration or frequency of observation. Observation and identification of nocturnal bird species are relatively challenging. Certain strategies or techniques need to be developed because what is faced is not only the dark sight, but also the thickness of the canopy and/or tidal inundation. In this study, two nocturnal bird species that were found by chance were Buffy Fish-owl and Sunda Scops-owl. It is likely that there are other nocturnal bird species at the sites.

Second, one sub-district on the west coast (Panyipatan sub-district) has not been represented in the study. However, the following findings of bird species from a wildlife photographer can be used as a guide that there are actually other birds on the west coast. Lesser Frigatebird (*Fregata andrewsi*), Great Tit (*Parus major*), Black-bellied Malkoha (*Phaenicophaeus diardi*), Buff-banded Rail (*Hypotaenidia philippensis*), and Copper-throated Sunbird (*Nectarinia calcostetha*) were sighted in the area by P. Irawan (2020, pers. com.).

#### Community similarity

The community similarity index between sites based on the presence or absence of species (0.77-0.84) is lower than that based on the number of individuals per species (0.79-0.90) (Table 3). The exception is the index based on the presence or absence of species between Tabanio and the

Sungai Bakau which is slightly higher than that based on the number of individuals of each species. Since the index based on the number of individuals for each species is generally higher or closer to 1.00, this index is better to use to measure community similarity between two sites.

The similar resources with adequate availability are the factors that cause the similarity of bird communities in the two compared sites to be categorized as high. These resources include food, nesting, microclimate and occurrence of predators. In the case of migratory bird species, both intra and inter continents, birds leave certain sites and come to other sites because they have the same resource. Site and season cause the availability of prey and species requirements for energy to vary and in turn the proportion of foraging birds also varies (Burton et al. 2004). The presence and diversity of migratory birds in various habitat types is largely determined by microhabitat, availability of food sources, and safety in resting and foraging areas (Sonobe and Usui 1993, Howes et al. 2003).

In the Sungai Bakau, the feed source area is disturbed by tidal inundation. Some waterbirds, or to be precise in this case are shorebirds, generally forage on mudflats that lie after the shoreline towards the sea. They forage in colonies within the same species and even with other waterbird species. However, when the high tide inundates or submerges the muddy areas, they move to and forage on other muddy areas, such as active ponds, non-operational ponds or former ponds. In this non-vegetated inland muddy field, they can still stand on the surface of the mud and their beaks can still reach the food on the surface or in the mud. Moving and looking for food in the mud inland is a strategy for waterbirds to survive. In general, the waterbird diet consists of plants, such as terrestrial plants, seeds and aquatic macrophytes, and animals, such as zooplankton, snails, shells, worms, crabs, mollusks, crustaceans, arthropods, larvae, and imago of terrestrial and aquatic insects (Coleoptera, Diptera, Heteroptera, Odonata), nectonic macroinvertebrates, fish, amphibians, and water snakes (Ntiamoa-Baidu et al. 1998, Horváth et al. 2012). The feed is obtained easily when the mud bed is not inundated by seawater and facilitates the birds to behave according to their morphology; for example, the soles and toes may step on the mud and the beak reaches for feed in the mud.

**Table 3.** Bird community similarity index between sites

Site	Sungai Rasau	Sungai Bakau	Tabanio	Pagatan Besar
Sungai Rasau	1.00	0.87	0.90	0.85
Sungai Bakau	0.84	1.00	0.73	0.88
Tabanio	0.78	0.74	1.00	0.79
Pagatan Besar	0.77	0.84	0.78	1.00

Note: The numbers below the diagonal line (top left - bottom right) are the community similarity index based on the presence or absence of species, and while above the diagonal line are that based on the number of individuals of each species.



The conditions that make water birds move are not only the tidal mud area, but also the growth and development of mangrove species. In Pagatan Besar village, for example, the muddy area which was originally an open area has gradually turned into a mangrove forest. The development of mangrove forests makes it difficult for migratory birds who are accustomed to foraging for food together (in colonies) on muddy plains in open areas. This change was observed from four ironwood walkways, which according to Soendjoto (2019) have 1.5 m wide and about 100 m long, jutting from the shoreline towards the Java Sea. The height of the walkway floor is 0 m from the ground level at the starting point of the walkway (at the shoreline) and about 2 m from the ground level (mud) at the end of the walkway (towards the sea). At Titian 1, which is located at the northernmost point, mangrove forests which are dominated by white mangrove are observed to be getting higher. The height in 2018 was around 4-5 m and in 2020 it is about 6 m. However, the sea and the mud can still be observed from the end of the walkway. At Titian 2, which is located 490 m to the south of Titian 1, the sea and mud can still be observed from half the length of the walkway to the end of the path in 2018. In 2020, the sea and mud can no longer be observed. The white mangroves reach 3-4 m in high and are covering the view. At Titian 3, which is located 190 m to the south of Titian 2, the sea and mud can be observed from the base to the end of the bridge in 2018 because the height of the white mangroves growing on the left and right is only about 0.5 m from the surface of the mud. In 2020, the height of the flames is 2 m around the base of the walkway and about 1 m around the end of the walkway. Several individual white mangroves had grown out of the direction of the sea from the end of the bridge. In other words, mangrove forests are growing or expanding. The sea and mudflats can still be observed starting from one-third of the length of the walkway to the end of the path. Titian 4 which is located 180 m to the south from Titian 3, the sea and mud can still be observed freely. The white mangroves are still few in number. In other words, the density is very low compared to the density of the white mangroves around Titian 1, 2, and 3. The height is also about 0.5 m above the ground (mud).

The stretch of mud on the west coast is formed by sediments carried by the Maluka River, Tabanio River, Pagatan Besar River, and Barito River as the widest river in South Kalimantan and then deposited in the Java Sea, where these rivers flow into. The main sediments on the Barito River are sand, clay and silt (Arisanty et al. 2014). Because the Barito River is the main route for coal transportation (Novico and Priohandono 2012), coal shale is also observed in the mud. According to Arisanty et al. (2012), shorelines can change and the changes are caused by human activities, such as logging, forest and land fires, intensive agriculture, and mining.

#### Bird status

Based on protection status of the regulation of Minister of Environment and Forestry, Republic of Indonesia No P.106/MENLHK/SETJEN/KUM.1/12/2018 (2018), most bird species (84.16%) are categorized as unprotected. Only

16 species (15.84%) are protected. Based on their conservation status of IUCN (2020), most bird species (91.09%) are categorized as Least Concern with a tendency of population to decrease (30 species), increase (13 species), stable (36 species), and unknown (13 species). The rest are categorized as Near Threatened (5 species, namely Green Iora, Sunda Teal, Fiery Minivet, Rufous-necked Stint, and Bar-tailed Godwit), Vulnerable (2 species, namely Lesser Adjutant and Javan Myna), and Endangered (2 species, namely Far Eastern Curlew and Javan White-eye. A large number of unprotected bird species while at the same time the least concern status is of course alarming. Many bird species have not been studied intensively, but their sustainability or survival is threatened.

Currently, people catch birds for at least two purposes. First, birds are used as a pet. Zebra Dove, Eastern Spotted Dove, Sooty-headed Bulbul, Yellow-vented Bulbul, and Javan Myna are kept because of their voice. Unfortunately, birds are kept without partners so they cannot reproduce. Second, bird species are consumed. White-breasted Waterhen, Yellow Bittern, and Wandering Whistling-duck are species that are traded and then enjoyed for their meat. The over catching and consumption of birds has definitely wiped them out.

In addition, land conversion, especially the protected areas or conservation areas into production areas also threatens the bird. Forest-dwelling birds who like lush bushes or under-canopy dwellers such as Western Hooded Pitta, Ioras, Pin-striped Tit-babbler, and Emerald Dove have lost their habitats. In contrast, birds that are able to adapt to open areas or grass vegetation find new habitats. They include Eurasian Tree Sparrow, Australasian Pipit, Western Yellow Wagtail, and Javan Myna.

Each bird species has its own ecological roles and functions. As carnivores, eagles and Brahminy Kite help maintain the balance of nature. Sooty-headed Bulbul, Yellow-vented Bulbul, and flowerpeckers are frugivores that help spread plant seeds from certain sites to other sites, so do Zebra Dove, Eastern Spotted Dove, and munias as granivores. Long-tailed Shrike, bee-eaters, and Sunda Pied Fantail as insectivores play a role in controlling pests and diseases in plants. Sunbirds as nectarivores not only act as nectar eaters, but also helps pollinate.

In conclusion, 101 bird species found in the west coast of South Kalimantan are classified as minimal. The species diversity index of the four sample sites ranges from 3.48 to 4.04. In general, the similarity index based on the number of individuals per species is greater than that based on the presence or absence of the species. Migratory birds can be developed as unique attractions or ecotourism objects on this west coast. White-breasted Kingfisher and Streaked Weaver are worth noting in field books when these birds have been found spreading in Kalimantan.

#### ACKNOWLEDGEMENTS

This research was funded by PNBP of Lambung Mangkurat University, Banjarmasin, Indonesia in the Fiscal

Year of 2020. We express our gratitude to the Rector of Lambung Mangkurat University who approved the funding for this research. Thanks also go to the Head of Tanah Laut District, Indonesia who allowed the research to be carried out in his administrative area and the enumeration team (Nur Abdi Suga) who helped collect data in the field.

## REFERENCES

- Adi. 2018. Bird Species Identification in Sungai Kaki and Sebangau Kecil. <https://www.tnsebangau.com/kegiatan-identifikasi-jenis-burung-di-sungai-kaki-dan-sebangau-kecil>. [Indonesian]
- Arief H, Mijiarjo J, Rahman A. 2015. Diversity and protection status of wildlife in PT Riau Sawitindo Abadi. *Media Konservasi* 20 (1): 159-165. DOI: 10.29244/medkon.20.2.%25p [Indonesian].
- Arisanty D, Sartohadi J, Marfai MA, Hadmoko DS. 2012. The Long-term morphodynamic of Barito Delta, Southern Kalimantan, Indonesia. *J Environ Sci Eng B* 1: 1196-1202.
- Arisanty D, Sartohadi J, Marfai MA, Hadmoko DS. 2014. Sediment dynamic in Barito Delta, Southern Kalimantan, Indonesia. *J Environ* 1 (1): 30-37.
- Ata Marie and Ekologika Consultants. 2017. Summary Report High Conservation Value Assessment PT Hutan Ketapang Industri-Kabupaten Ketapang, West Kalimantan Province. Ata Marie & Ekologika Consultants, Jakarta.
- Avibase. 2020a. Streaked Weaver *Ploceus manyar* (Horsfield, 1821). <https://avibase.bsc-eoc.org>.
- Avibase. 2020b. White-throated Kingfisher *Halcyon smyrnensis* (Linnaeus, 1758). <https://avibase.bsc-eoc.org>.
- Ayat A. 2011. Agroforest Birds in Sumatra. World Agroforestry Centre-ICRAF, SEA Regional Office, Bogor, Indonesia. [Indonesian]
- Bierregaard RO, Poole AF, Washburn BE. 2014. Ospreys (*Pandion haliaetus*) in the 21<sup>st</sup> century: Populations, migration, management, and research priorities. *J Raptor Res* 48 (4): 301-308. DOI: 10.3356/0892-1016-48.4.301
- Burton NHK, Musgrove AJ, Rehfishch MM. 2004. Tidal variation in numbers of waterbirds: how frequently should birds be counted to detect change and do low tide counts provide a realistic average? *Bird Stud* 51: 48-57.
- Clancy GP. 2006. The breeding biology of the Osprey *Pandion haliaetus* on the North Coast of New South Wales. *Corella. J Austr Bird Stud Assoc* 30 (1): 1-8.
- Decandido R, Nualsri C, Allen D. 2010. Mass northbound migration of Blue-tailed *Merops philippinus* and Blue-throated *M. viridis* Bee-eaters in southern Thailand, spring 2007-2008. *Forktail* 26: 42-48.
- Dennis TE, Clancy GP. 2014. The status of the Osprey (*Pandion haliaetus cristatus*) in Australia. *J Raptor Res* 48 (4): 1-7. DOI: 10.3356/JRR-OSPR-14-01.1
- Detmar SA, Dennis TE. 2018. A review of Osprey distribution and population stability in South Australia. *South Australian Ornithologist* (43): 1-2.
- Ducks Unlimited New Zealand. 2017. What are waterbirds? <https://ducks.org.nz>.
- EAAFP. 2018. Shorebird Color Flagging Protocol on the East Asian-Australasian Flyway. [https://eaaflyway.net/wp-content/uploads/2017/12/Protocol\\_birds-marking.pdf](https://eaaflyway.net/wp-content/uploads/2017/12/Protocol_birds-marking.pdf)
- Germi F, Young GS, Salim A, Pangimangen W, Schellekens M. 2009. Over-ocean raptor migration in a monsoon regime: spring and autumn 2007 on Sangihe, North Sulawesi, Indonesia. *Forktail* 25: 104-116.
- Horváth Z, Ferenczi M, Móra A, Vad CF, Ambrus A, Fornó L, Szóvényi G, Andrikovics S. 2012. Invertebrate food sources for waterbirds provided by the reconstructed wetland of Nyirkai-Hany, northwestern Hungary. *Hydrobiologia* 697: 59-72. DOI: 10.1007/s10750-012-1170-5.
- Howes J, Bakewell D, Noor YR. 2003. Panduan Studi Burung Pantai. Wetlands International Indonesia Program, Bogor. [Indonesian]
- Iqbal M, Irawan P, Fauzi A, Rahman I. 2016. Introduced Species: Streaked Weaver *Ploceus manyar*, a new species for Kalimantan, Borneo. *Birding ASIA* 25: 71-72.
- Irhah M. 2012. Avifauna diversity at Central Halmahera North Maluku, Indonesia. *Zoo Indonesia* 21 (1): 17-31.
- Iswandaru D, Khalil ARA, Kuniawan B, Pramana R, Febryano IG, Winarno GD. 2018. Abundance and diversity of bird species in Mangrove Forest KPHL Gunung Balak. *Indonesian J Conserv* 7 (1): 57-62. [Indonesian]
- IUCN [International Union for Conservation of Nature]. 2020. The IUCN Red List of Threatened Species. Version 2020-2. <https://www.iucnredlist.org>
- Kamal S, Agustina E, Rahmi Z. 2016. Bird species in some habitat types in Kecamatan Lhoknga, Kabupaten Aceh Besar. *Jurnal Biotik* 4 (1): 15-32. [Indonesian]
- MacKinnon J, Phillipps K, van Balen B. 2010. LIPI- Field Guide of Birds in Sumatra, Kalimantan, Java and Bali. Puslitbang Biologi- LIPI, Bogor. [Indonesian]
- Myers S. 2016. Helm Field Guides, Birds of Borneo, 2<sup>nd</sup> ed. NHBS, UK.
- Nash SV, Nash AD. 1985. A checklist of the forest and forest edge birds of the Padang-Sugihan Wildlife Reserve, South Sumatra. *Kukila* 2 (3): 51-59.
- Nisbet ICT. 2013. Seasonal occurrence, migrations and habitat relationships of Blue-tailed and Blue-throated Bee-eaters *Merops philippinus* and *M. viridis* in Peninsular Malaysia. *Raffles Bull Zool Suppl.* 29: 219-223.
- Novico F, Priohandono YA. 2012. Analysis of erosion and sedimentation patterns using software of Mike 21 HDMF-MT in The Kapuas Murung River Mouth Central Kalimantan Province. *Bull Mar Geol* 27 (1): 35-53.
- Ntiamao-Baidu Y, Piersma T, Wiersma P, Poot M, Battley P, Gordon C. 1998. Water depth selection, daily feeding routines and diets of waterbirds in coastal lagoons in Ghana. *Ibis* 140 (1): 89-103. DOI: 10.1111/j.1474-919X.1998.tb04545.x
- Purwanto AA, Rakhman Z, Supriatna AA, Sutito ASB, Srirejeki I. 2015. Current information on migratory raptors and its conservation efforts in Indonesia. *Asian Raptors* 1: 54-62.
- Rachman R, Sudiarty N, Ismawati, Sumbawati NK, Hun S. 2020. Analysis of household income in swiftlet cultivation in Karang Dima Village, Labuhan Badas District. Prosiding Seminar Nasional IPPeMas 2020 Inovasi Hasil Penelitian dan Pengabdian kepada Masyarakat dalam Menuju Era Industri 4.0. [Indonesian]
- Ramsar Convention Secretariat. 2016. An Introduction to the Convention on Wetlands (previously The Ramsar Convention Manual). Ramsar Convention Secretariat, Gland, Switzerland.
- Riefani MK, Arsyad M. 2019. Bird species in Mangrove Ecotourism Area of Pagatan Besar, Tanah Laut Regency, Indonesia. Prosiding Seminar Nasional Lingkungan Lahan Basah 4 (1): 192-196. [Indonesian]
- Riefani MK, Soendjoto MA, Munir AM. 2019. Bird species in the cement factory complex of Tarjun, South Kalimantan, Indonesia. *Biodiversitas* 20 (1): 218-225. DOI: 10.13057/biodiv/d200125
- Santosa RA, Harianto SP, Nircahyani N. 2016. Comparison of the population of Kingfisher bird (Halcyonidae) in the wetlands of Sungai Luar Village and the wetlands of Kibang Pacing Village, Menggala Timur District, Tulang Bawang Regency. *Jurnal Sylva Lestari* 4 (2): 79-88. DOI: 10.23960/jsl2479-88. [Indonesian]
- Santosa Y, Sugiharti W, Erniwati. 2018. The variation of bird diversity in different land cover at oil palm plantation: Case study at Asm Oil Palm Estate in Central Kalimantan, Indonesia. *E3S Web of Conferences* 52, 00051. DOI: 10.1051/e3sconf/20185200051.
- Smythies BE. 1960. The Birds of Borneo. The Sabah Society & The Malaya Nature Society, Kuala Lumpur, Malaysia.
- Soendjoto MA, Nugroho Y, Suyanto, Riefani MK, Supandi, Yudha HES. 2019. Avifauna in the Area of PT Borneo Indobara Kalimantan Selatan, Banyubening, Banjarbaru. [Indonesian]
- Soendjoto MA, Riefani MK, Ready A. 2014. New record: Streaked Weaver (*Ploceus manyar*) in Kalimantan Selatan. *Warta Konservasi Lahan Basah* 22 (3): 16-17. [Indonesian]
- Soendjoto MA, Riefani MK, Triwibowo D, Metasari D. 2018. Birds observed during the monitoring period of 2013-2017 in the revegetation area of ex-coal mining sites in South Kalimantan, Indonesia. *Biodiversitas* 19 (1): 323-329. DOI: 10.13057/biodiv/d190144
- Soendjoto MA, Riefani MK, Triwibowo D, Wahyudi F. 2015. Avifauna in Reclamation Area of PT Adaro Indonesia. Universitas Lambung Mangkurat Press, Banjarbaru, Indonesia. [Indonesian]
- Soendjoto MA. 2019. Potential and problems in development of the ecotourism area (Case in the Pagatan Besar Mangrove Forest, Tanah Laut Regency, Indonesia). Prosiding Seminar Nasional Lingkungan Lahan Basah 4 (3): 635-642.

- Sonobe K, Usui S. 1993. A Field Guide to the Waterbirds of Asia. Wild Bird Society of Japan, Tokyo.
- Strange M. 2012. A Photographic Guide to the Birds of Indonesia. 2<sup>nd</sup> ed. Tuttle Publishing, Tokyo.
- Sudiyanto T. 2018. The impact of the swiftlet business on changes in the economy of the Betung Banyuasin community. *Jurnal Media Wahana Ekonomika* 12 (3): 101-109. [Indonesian]
- Syamsi F. 2017. Bird diversity in wetland area of Kota Batam. *Simbiosis* 6 (1): 17-30. [Indonesian]
- Taufiqurrahman I, Purwanto AA, Tirtaningtyas FN, Ade S, Rachman M, Daryana A, Hermawan AS, Yordan K, Emmanuel B, Kristanto A, Kiryono, Purnama S, Sujatmiko DA. 2019. Recent records of White-breasted Kingfisher *Halcyon smyrnensis* on Java, Indonesia, with notes on its status and distribution. *BirdingASIA* 31: 74-78.
- van Balen SB. 1998. Tropical forest raptors in Indonesia: Recent information on distribution, status, and conservation. *J Raptor Res* 32 (1): 56-63.
- Wetlands International. 2020. Waterbird Population Estimates. <https://wpe.wetlands.org>.
- Wulansari A, Soendjoto MA, Suyanto. 2020. Bird species diversity in natural vegetation of Liang Anggang Protected Forest Area- Block 1, Banjarbaru, Indonesia. *Jurnal Sylva Scientiae* 3 (5): 818-824. [Indonesian]

ISSN: 1412-033X  
E-ISSN: 2085-4722

# BIODIVERSITAS

**Journal of Biological Diversity**

Volume 22 - Number 1 - January 2021



*Front cover: Athene cunicularia* (Molina, 1782)  
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Published monthly

PRINTED IN INDONESIA

ISSN: 1412-033X

E-ISSN: 2085-4722



9 771412 033726



9 772085 472720

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Journal of Biological Diversity  
Volume 22 - Number 1 - January 2021

ISSN/E-ISSN:

1412-033X (printed edition), 2085-4722 (electronic)

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Jl. Ir. Sutami 36A Surakarta 57126. Tel. +62-271-7994097, Tel. & Fax.: +62-271-663375, email: editors@smujo.id

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Rai MK, Carpinella C. 2006. Naturally Occurring Bioactive Compounds. Elsevier, Amsterdam.

### Chapter in book:

Webb CO, Cannon CH, Davies SJ. 2008. Ecological organization, biogeography, and the phylogenetic structure of rainforest tree communities. In: Carson W, Schnitzer S (eds) *Tropical Forest Community Ecology*. Wiley-Blackwell, New York.

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Assaeed AM. 2007. Seed production and dispersal of *Rhazya stricta*, 50<sup>th</sup> annual symposium of the International Association for Vegetation Science, Swansea, UK, 23-27 July 2007.

### Proceeding:

Alikodra HS. 2000. Biodiversity for development of local autonomous government. In: Setyawan AD, Sutarno (eds.) *Toward Mount Lawu National Park; Proceeding of National Seminary and Workshop on Biodiversity Conservation to Protect and Save Germplasm in Java Island*. Universitas Sebelas Maret, Surakarta, 17-20 July 2000. [Indonesian]

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Sugiyarto. 2004. Soil Macro-invertebrates Diversity and Inter-Cropping Plants Productivity in Agroforestry System based on Sengon. [Dissertation]. Universitas Brawijaya, Malang. [Indonesian]

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Balagadde FK, Song H, Ozaki J, Collins CH, Barnet M, Arnold FH, Quake SR, You L. 2008. A synthetic *Escherichia coli* predator-prey ecosystem. *Mol Syst Biol* 4: 187. [www.molecularsystemsbiology.com](http://www.molecularsystemsbiology.com)

# BIODIVERSITAS

Journal of Biological Diversity  
Volume 22 - Number 1 - January 2021

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<b>The ultrastructure changes of <i>Haemonchus contortus</i> exposed to bamboo leaves (<i>Gigantochloa apus</i>) aqueous extract under in vitro condition</b> BUDI PURWO WIDIARSO, WISNU NURCAHYO, KURNIASIH, JOKO PRASTOWO	1-5
<b>Documentation of medicinal plants used by Aneuk Jamee tribe in Kota Bahagia Sub-district, South Aceh, Indonesia</b> ADI BEJO SUWARDI, MARDUDI, ZIDNI ILMAN NAVIA, BAIHAQI, MUNTAHA	6-15
<b><i>Ganoderma</i> diversity from smallholder oil palm plantations in peat lands of Kampar District, Indonesia based on mycelia morphology and somatic incompatibility</b> ANTHONY HAMZAH, RACHMAD SAPUTRA, FIFI PUSPITA, BESRI NASRUL, IRFANDRI, NOVITA SARI DEPARI	16-22
<b>Level of lead contamination in the blood of Bali cattle associated with their age and geographical location</b> I KETUT BERATA, NI NYOMAN WERDI SUSARI, I WAYAN SUDIRA, KADEK KARANG AGUSTINA	23-29
<b>Aquatic insect communities in headwater streams of Ciliwung River watershed, West Java, Indonesia</b> WAKHID, AUNU RAUF, MAJARIANA KRISANTI, I MADE SUMERTAJAYA, NINA MARYANA	30-41
<b>The potential of amylase enzyme activity against bacteria isolated from several lakes in East Java, Indonesia</b> INDAH KHOIRUN NISA, SITORESMI PRABANINGTYAS, BETTY LUKIATI, RINA TRITURANI SAPTAWATI, ACHMAD RODIANSYAH	42-49
<b>Biodiversity and phylogenetic analyses using DNA barcoding <i>rbcl</i> gene of seagrass from Sekotong, West Lombok, Indonesia</b> STEVANUS, MADE PHARMAWATI	50-57
<b>Short communication: Physiological response to drought in North Sulawesi (Indonesia) local rice (<i>Oryza sativa</i>) cultivars at the tissue level in hydroponic culture</b> SONG AI NIO, RISA JUNITA MEREH, DANIEL PETER MANTILEN LUDONG	58-64
<b>Short Communication: Species composition and diversity of vegetation in dryland agricultural landscape</b> IDA ARDIYANINGRUM, MARIA THERESIA SRI BUDIASTUTI, KOMARIAH	65-71
<b>Der p1 gene sequence polymorphism in house dust mite <i>Dermatophagoides pteronyssinus</i></b> ARYANI ADJI, NURDJANNAH J. NIODE, VENTJE V. MEMAH, JIMMY POSANGI, GRETA J. P. WAHONGAN, TRINA E. TALLEI	72-78
<b>Short Communication: The bioinformatics perspective of <i>Foeniculum vulgare</i> fruit's bioactive compounds as natural anti-hyperglycemic against alpha-glucosidase</b> FATCHUR ROHMAN, WIRA EKA PUTRA	79-84
<b>Short Communication: Characterization and nutrient analysis of seed of local cowpea (<i>Vigna unguiculata</i>) varieties from Southwest Maluku, Indonesia</b> R. L. KARUWAL, SUHARSONO, A. TJAHJOLEKSONO, N. HANIF	85-91
<b>Soil mesofauna amount and diversity by returning fresh and compost of crops biomass waste in ultisols in-situ</b> JUNITA BARUS, DIAN MEITHASARI, JAMALAM LUMBANRAJA, HAMIM SUDARSONO, KUSWANTA FUTAS HIDAYAT, DERMIYATI	92-98



<b>Development of monospecific polyclonal antibodies against hypervirulent <i>Klebsiella pneumoniae</i></b>	<b>99-105</b>
DARNIATI, SURACHMI SETIYANINGSIH, DEWI RATIH AGUNGPRIYONO, EKOWATI HANDHARYANI	
<b>The structure and composition of macrozoobenthos community in varying water qualities in Kalibaru Waters, Bengkulu City, Indonesia</b>	<b>106-112</b>
LILISTI, ZAMDIAL TAALUDIN, DEDE HARTONO, BIENG BRATA, MARULAK SIMARMATA	
<b>The morphological characters and DNA barcoding identification of sweet river prawn <i>Macrobrachium esculentum</i> (Thallwitz, 1891) from Rongkong watershed of South Sulawesi, Indonesia</b>	<b>113-121</b>
JURNIATI, DIANA ARFIATI, SAPTO ANDRIYONO, ASUS MAIZAR SURYANTO HERTIKA, ANDI KURNIAWAN, WENDY ALEXANDER TANOD	
<b>Socio-ecological dimensions of agroforestry called <i>kebun campuran</i> in tropical karst ecosystem of West Java, Indonesia</b>	<b>122-131</b>
PARIKESIT, SUSANTI WITHANINGSIH, FAKHRUR ROZI	
<b>Microbiological, physical and chemical properties of Joruk (fermented fish product) with different levels of salt concentration</b>	<b>132-136</b>
DYAH KOESOEMAWARDANI, LULU ULYA AFIFAH, NOVITA HERDIANA, SUHARYONO A.S, ESA GHANIM FADHALLAH, MAHRUS ALI	
<b>Physicochemical and functional properties of spineless, short-spines, and long-spines sago starch</b>	<b>137-143</b>
BUDI SANTOSO, ZITA LETVIANY SARUNGALLO, ANGELA MYRRA PUSPITA	
<b>Assessment of mangrove species diversity in Bananaybanay, Davao Oriental, Philippines</b>	<b>144-153</b>
BRIAN L. POTOTAN, NEIL C. CAPIN, AILEEN GRACE D. DELIMA, ANNABELLE U. NOVERO	
<b>Procruste analysis of forewing shape in two endemic honeybee subspecies <i>Apis mellifera intermissa</i> and <i>Apis mellifera sahariensis</i> from the Northwest of Algeria</b>	<b>154-164</b>
ABDULMOJEED YAKUBU, FOUZIA ABED, BENABDELLAH BACHIR-BOUIADJRA, LAHOUARI DAHLOUM, AHMED HADDAD, ABDELKADER HOMRANI	
<b>Molecular analysis of Taro and Bali cattle using cytochrome oxidase subunit I (CO1) in Indonesia</b>	<b>165-172</b>
NI NYOMAN WERDI SUSARI, PUTU SUASTIKA, KADEK KARANG AGUSTINA	
<b>Urbanization level and its effect on the structure and function of homegarden (<i>pekarangan</i>) vegetation in West Java, Indonesia</b>	<b>173-183</b>
MUHAMMAD SADDAM ALI, HADI SUSILO ARIFIN, NURHAYATI H.S. ARIFIN	
<b>Genetic diversity and relationship of husk tomato (<i>Physalis</i> spp.) from East Java Province revealed by SSR markers</b>	<b>184-192</b>
HALIMATUS SADIYAH, SUMERU ASHARI, BUDI WALUYO, ANDY SOEGIANTO	
<b>Species diversity and phenetic relationship among accessions of api-api (<i>Avicennia</i> spp.) in Java based on morphological characters and ISSR markers</b>	<b>193-198</b>
FENNALIA PUTRI SABDANAWATY, PURNOMO, BUDI SETIADI DARYONO	
<b>Diversity of macro fungus across three altitudinal ranges in Lore Lindu National Park, Central Sulawesi, Indonesia and their utilization by local residents</b>	<b>199-210</b>
Y. YUSRAN, E. ERNIWATI, D. WAHYUNI, R. RAMADHANIL, A. KHUMAIDI	
<b>Updating of Makiling Biodiversity Information System (MakiBIS) and Analysis of Biodiversity Data</b>	<b>211-226</b>
DAMASA B. MAGCALE-MACANDOG, FERMIN ROBERTO G. LAPITAN, GEOFFREY M. LARUYA, JANDREL IAN F. VALERIO, JANZEN CHRISTIAN D. AGUILA, CLOUIE ANN L. MESINA, TWINKLE MARIE F. SANTOS, ANDREA NICOLE T. CUEVAS, KIMBERLY D. BAYLON, IANA MARIENE SILAPAN, RICAJAY DIMALIBOT, JENNIFER D. EDRIAL, NETHANEL JIREH A. LARIDA, FATIMA A. NATUEL, MA. GRECHELLE LYN D. PEREZ, SARENA GRACE L. QUINONES	

<b>Short Communication: Acute toxicity study of plantaricin from <i>Lactobacillus plantarum</i> S34 and its antibacterial activity</b> ARIDO YUGOVELMAN AHADDIN, SRI BUDIARTI, A. ZAENAL MUSTOPA, HUDA S. DARUSMAN, LITA TRIRATNA	227-232
<b>Diversity and distribution of figs (<i>Ficus</i>: Moraceae) in Gianyar District, Bali, Indonesia</b> I MADE SAKA WIJAYA, MADE RIA DEFIANI	233-246
<b>Mangrove associated macrobenthos community structure from an estuarine island</b> MD. HABIBUR RAHMAN, M. BELAL HOSSAIN, AHASAN HABIB , MD. ABU NOMAN, SHUVAGATO MONDAL	247-252
<b>Dietary <i>Bacillus</i> NP5 supplement impacts on growth, nutrient digestibility, immune response, and resistance to <i>Aeromonas hydrophila</i> infection of African catfish, <i>Clarias gariepinus</i></b> ACHMAD NOERKHAERIN PUTRA, MUSTAHAL, MAS BAYU SYAMSUNARNO, DODI HERMAWAN, DEVIA GUSNUR FATIMAH, PRAMODITA BALITA PUTRI, SEVIA, RINA ISNAINI, MUHAMAD HERJAYANTO	253-261
<b>Bird community structure as a function of habitat heterogeneity: A case of Mardi Himal, Central Nepal</b> NARESH PANDEY, LAXMAN KHANAL, NEETI CHAPAGAIN, K. DEEPAK SINGH, BISHNU P. BHATTARAI, MUKESH KUMAR CHALISE1	262-271
<b>Conservation status of large mammals in protected and logged forests of the greater Taman Negara Landscape, Peninsular Malaysia</b> GOPALASAMY REUBEN CLEMENTS, SUSANA ROSTRO-GARCÍA, JAN F. KAMLER, SONG HORNG LIANG, ABDUL KADIR BIN ABU HASHIM	272-277
<b>Birds in the west coast of South Kalimantan, Indonesia</b> MAULANA KHALID RIEFANI , MOCHAMAD ARIEF SOENDJOTO	278-287
<b>Richness and diversity of insect pollinators in various habitats around Bogani Nani Wartabone National Park, North Sulawesi, Indonesia</b> RONI KONERI, MEIS J. NANGOY, WAKHID	288-297
<b>Diversity of biocontrol agents, isolated from several sources, inhibitory to several fungal plant pathogens</b> YAN RAMONA, IDA BAGUS GEDE DARMA YASA, ANAK AGUNG NGURAH NARA KUSUMA, MARTIN A. LINE	298-303
<b>Presence of multidrug resistance (MDR) and extended spectrum beta lactamase (ESBL) of <i>Escherichia coli</i> isolated from cloacal swab of broilers in several wet markets in Surabaya, Indonesia</b> MUSTOFA HELMI EFFENDI, WIWIEK TYASNINGSIH, YEMIMA ANGGUN YURIANTI, JOLA RAHMAHANI, NENNY HARIJANI, HANI PLUMERIASTUTI	304-310
<b>Population, distribution, and habitat of Bornean Elephant in Tulin Onsoi, Nunukan District, Indonesia based on dung counts</b> WISHNU SUKMANTORO, AGUS SUYITNO, MULYADI, DONI GUNARYADI, AGANTO SENO, ALFRED INDRA KUSUMA, DARWIS	311-319
<b>Acclimating leaf celery plant (<i>Apium graveolens</i>) via bottom wet culture for increasing its adaptability to tropical riparian wetland ecosystem</b> BENYAMIN LAKITAN, KARTIKA KARTIKA, SUSILAWATI, ANDI WIJAYA	320-328
<b>Short Communication: Wildlife species used as traditional medicine by local people in Indonesia</b> ANI MARDIASTUTI, BURHANUDDIN MASY'UD, LIN N. GINOGA, HAFIYYAN SASTRANEGARA, SUTOPO	329-337
<b>Assessment of some heavy metals in various aquatic plants of Al-Hawizeh marsh, southern of Iraq</b> DUNYA A.H. AL-ABBAWY, BASIM M. HUBAIN AL-THAHAIBAWI, ITHAR K.A.AL-MAYALY, KADHIM H. YOUNIS	338-345

<b>The influence of environmental factors on the distribution and composition of plant species in Oued Charef dam, northeast of Algeria</b> NAOUEL MOUALKI, NADHRA BOUKROUMA	346-353
<b><i>Shewanella baltica</i> strain JD0705 isolated from the mangrove wetland soils in Thailand and characterization of its ligninolytic performance</b> AIYA CHANTARASIRI	354-361
<b>Utilization of plant resources among the <i>Kankanaeys</i> in Kibungan, Benguet Province, Philippines</b> ABIGAIL T. BERSAMIN, JUDE L. TAYABEN, KRYSSA D. BALANGCOD, ASHLYN KIM D. BALANGCOD, AMELIA C. CENDANA, ELIZABETH T. DOM-OGEN, LANCE OLIVER C. LICNACHAN, BRENILYN SIADTO, FRED A. M. WONG, TEODORA D. BALANGCOD	362-372
<b>Antibacterial potential of symbiont bacteria of brown algae (<i>Turbinaria conoides</i>) obtained from Indonesian waters</b> NIKEN DHARMAYANTI, ARMA ANTI, RESMI RUMENTA SIREGAR, YULIATI H. SIPAHUTAR, AEF PERMADI, ARPAN NASRI SIREGAR, RANDI BOKHI SALAMPCESSY, SUJULIYANI, SITI ZACHRO NURBANI, HENI BUDI PURNAMASARI	373-377
<b>Flowering and fruit quality characteristics in some seeded and seedless pummelo cultivars</b> UMMU KALSUM, SLAMET SUSANTO, AHMAD JUNAEDI, NURUL KHUMAIDA, HENI PURNAMAWATI	378-385
<b>Ethnobotanical study of medicinal plants used for maintaining stamina in Madura ethnic, East Java, Indonesia</b> AKHMAD FATHIR, MOCH. HAIKAL, DIDIK WAHYUDI	386-392
<b>Drought tolerance selection of GT1 rubber seedlings with the addition of polyethylene glycol (PEG) 6000</b> SYARIFAH AINI PASARIBU, MOHAMMAD BASYUNI, EDISON PURBA, YAYA HASANAH	393-400
<b>Riparian plant diversity in relation to artisanal mining sites in Cikidang River, Banten, Indonesia</b> NOVERITA DIAN TAKARINA, IKA LINA SINAGA, TRI RIFQOH KULTSUM	401-407
<b>The potency of <i>Sansevieria trifasciata</i> and <i>S. cylindrica</i> leaves extracts as an antibacterial against <i>Pseudomonas aeruginosa</i></b> WHIKA FEBRIA DEWATISARI, LAURENTIUS HARTANTO NUGROHO, ENDAH RETNANINGRUM, YEKTI ASIH PURWESTRI	408-415
<b>Local snake fruit conservation in East Java, Indonesia: Community knowledge and appreciation</b> NOVITA K. INDAH, SERAFINAH INDRIYANI, ESTRI LARAS ARUMINGTYAS, RODIYATI AZRIANINGSIH	416-423
<b>Effects of <i>Caulerpa lentillifera</i> added into culture media on the growth and nutritional values of <i>Phronima pacifica</i>, a natural fish-feed crustacean</b> VIVI ENDAR HERAWATI, PINANDOYO, RESTIANA WISNU ARIYATI, NURMANITA RISMANINGSIH, SETO WINDARTO, SLAMET BUDI PRAYITNO, Y.S. DARMANTO, OCKY KARNA RADJASA	424-431
<b>Endophytic bacteria associated with rice roots from suboptimal land as plant growth promoters</b> NUR PRIHATININGSIH, HERU ADI DJATMIKO, PUJI LESTARI	432-437
<b>Potential analysis of location, socio-culture and biodiversity as ecotourism attraction in Valentine Bay on Buano Island, West Seram, Maluku, Indonesia</b> MARTHA E. SIAHAYA, PAULUS MATIUS, MARLON I. AIPASSA, YAYA RAYADIN, YOSEP RUSLIM, HENDRIK S.E.S. APONNO	438-448
<b>Molecular bird sexing on kutilang (<i>Pycnonotus</i> sp.) based on amplification of CHD-Z and CHD-W genes by using polymerase chain reaction method</b> YUDITH VIOLETTA PAMULANG, ARIS HARYANTO	449-452

<b>Status of biodiversity in wetlands of Biswanath district of Assam, India</b> RANJIT KAKATI, NIKU DAS, ABHISHEK BHUYAN, DIPANKAR BORAH	453-471
<b>Agronomic performance and pod shattering resistance of soybean genotypes with various pod and seed colors</b> AYDA KRISNAWATI, M. MUCHLISH ADIE	472-479
<b>Chemical composition and antibacterial activities of <i>Rhus tripartita</i> essential oil in Algeria</b> KHAOULA BENLEMBAREK, TAKIA LOGRADA, MESSAOUD RAMDANI, GILLES FIGUEREDO, PIERRE CHALARD	480-490
<b>Drumstick (<i>Moringa oleifera</i>) variation in biomass and total flavonoid content in Indonesia</b> RIDWAN, HAMIM, SUHARSONO, NURIL HIDAYATI, INDRA GUNAWAN	491-498
<b>Short Communication: New distributional record of <i>Phyllanthus securinoides</i> Merr. (Phyllanthaceae) and <i>Rinorea niccolifera</i> Fernando (Violaceae) of Homonhon Island, Philippines</b> ROANNE B. ROMEROSO,, DANILO N. TANDANG, IAN A. NAVARRETE	499-503

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