SHORT COMMUNICATION

Journal of Oil Palm Research Vol. 37 (2) June 2025 p. 370-376
DOI: https://doi.org/10.21894/jopr.2024.0052

THE FIRST RECORD OF THE WHITE-THROATED KINGFISHER, *Halcyon smyrnensis*, BREEDING IN BORNEO, INDONESIA

MUHAMMAD SILMI[1]; MAHFUD HUDA[1]; ALI AMRAN[1]; SURYADI[1]; MISLAN[1]; FILA ISTINA MACHID[1]; ALDINO FAUZIL FANANI[1]; AGUSTINA KRISTIN HANDAYANI[1] and CARL TRAEHOLT[2]*

ABSTRACT

The White-throated kingfisher, Halcyon smyrnensis*, is widely distributed from the Middle East throughout most of Southeast Asia except for the island of Borneo, where it has been recorded as an occasional visitor but not yet as a resident breeder. During standard biodiversity monitoring activities, adult birds were regularly observed at PT Suria Sawit Sejati (PTSSS) estates. Regular monitoring of adult birds commenced and the location of observations was mapped. Records of birds in pairs suggested that these were indeed pairs and subsequent monitoring confirmed this. Here we present comprehensive evidence of the White-throated kingfisher as a resident breeder in Central Kalimantan, Indonesian Borneo.*

Keywords: Borneo, *Halcyon smyrnensis*, resident breeder, White-throated kingfisher.

Received: 13 February 2024**; Accepted:** 3 September 2024**; Published online:** 18 November 2024.

INTRODUCTION

The White-throated kingfisher, *Halcyon smyrnensis*, is widely distributed from the Sinai Peninsula in the Middle East, through the Indian subcontinent to the Philippines and South, through West Malaysia, Sumatra to Java, Indonesia (BirdLife International, 2017; Iswandaru *et al*., 2020; Taufiqurrahman *et al*., 2019; Woodall & Kirwan, 2020) represented by six different subspecies (Andersen *et al*., 2017). It is listed as *Least Concern* on the International Union for Conservation of Natures (IUCN) Red list. This is a large kingfisher species, measuring 27-28 cm in length, with a predominantly brown head and chest and blue back and wings (eBird, 2024). Its bill is red and the snow-white patch from the throat through the breast gives rise to its name (eBird, 2024). The adult has a bright blue back, wings, and tail. Its head, shoulders, flanks, and lower belly are chestnut and the throat and breast are white. The large bill and legs are bright red. In most of its distribution range, it is observed as a resident breeder in a variety of habitats, along waterways and mangroves as well as in human-altered landscapes (Ali *et al*., 2010; Burton, 1998; Palkar *et al*., 2009; Reza *et al*., 2003), where it feeds on a wide variety of prey, including small reptiles, amphibians, crabs and birds (Burton, 1998; Purandare, 2008; Roberts & Priddy, 1965; Tehsin, 1995; Yahya & Yasmin, 1991). The breeding season appears to span over March-June depending on the location in its distribution range (Ali *et al*., 2010; Prakash *et al*., 2021; Rehman *et al*., 2022; Sela-Klein *et al*., 2023). Nesting holes are excavated in vertical earth or riverbanks and measure approximately 30-152 cm deep (Ali *et al*., 2010; Palkar *et al*., 2009). There remain only a few recent records from Western Java (Taufiqurrahman *et al*., 2019), which may suggest that the species may be dispersing eastwards, where habitat is plentiful, because of its adaptation to human-dominated landscapes. It has been infrequently recorded in Borneo, especially along the western coastal area (eBird, 2023).

Considering the species-wide distribution range, its IUCN status, its adaptability across a wide range of habitats, and its presence already in Borneo, means it is only a matter of time before some individuals establish themselves as residential breeders in Borneo too. Here we report on sightings of White-throated kingfisher breeding in the far south of Central Kalimantan, Indonesia.

[1] Biodiversity Division,
United Plantations Bhd.,
PT Surya Sawit Sejati,
Kalimantan Tengah, Indonesia.

[2] Copenhagen Zoo, Conservation Division,
Roskildevej 38, 2000 Frederiksberg, Denmark.

* *Corresponding author e-mail: cat@zoo.dk*

MATERIALS AND METHODS

The observations took place in United Plantations Bhd's (UP) subsidiary plantations, PT Suria Sawit Sejati (PTSSS) in Central Kalimantan, Indonesia (*Figure 1*), where the White-throated kingfisher was first spotted in the plantations in Lada Estate, in November 2017. The area consists primarily of oil palm monoculture, with patches of degraded mixed tropical rainforest, peat forest and riverine habitat. At the time, it was considered a vagrant to Borneo and we categorised it as a general observation. The first detailed observation took place when an individual *Halcyon smyrnensis* perched on a tree branch on the 19th of October 2019. Subsequently, patrol teams and staff made *ad hoc* observations using binoculars (Nikon Monarch 7 10x48) and a camera (Nikon D800E, Tamron SP 150-600 mm lens) with each entry added to a database. A Digital inspection camera, CEN-TECH®, 2.4-inch LCD was used to check nesting holes for eggs and chicks.

RESULTS AND DISCUSSION

The perch site where the first White-throated kingfisher was observed was used extensively and made it possible to obtain clear photographic evidence of the bird (*Figure 2*). From the perching behaviour and the potential time of the year for breeding, we assumed that the perching individual was a male overlooking his territory. After a week of *ad hoc* observations, the bird was observed flying to a small grassy earth bank forming part of a backyard garden of a staff-house, adjacent to a small riparian forest reserve. Here it had excavated a nesting hole (*Figure 3*) and was later spotted with what we assumed was a female. Subsequent frequent use of the nesting hole suggested that the pair had produced chicks, and this was confirmed using a digital inspection camera (*Figure 4*). During the following 18 months, White-throated kingfishers were regularly observed, with an average of 14.5 observations/month (n = 176, SD 8.3, range 2-31), with December 2019 peaking with 28 observations (*Table 1*). From November 2017 until March 2021, we observed the species 183 times (*Table 1*).

We recorded a total of seven nesting holes, all of which were located in earth banks in the oil palm estates. These were either earth banks on roadsides or along ditches and canals in the estates. The diameter of the entrance holes averaged 5.9 cm (n = 7, SD ± 0.3, range 5.5-6.5 cm) with the distance

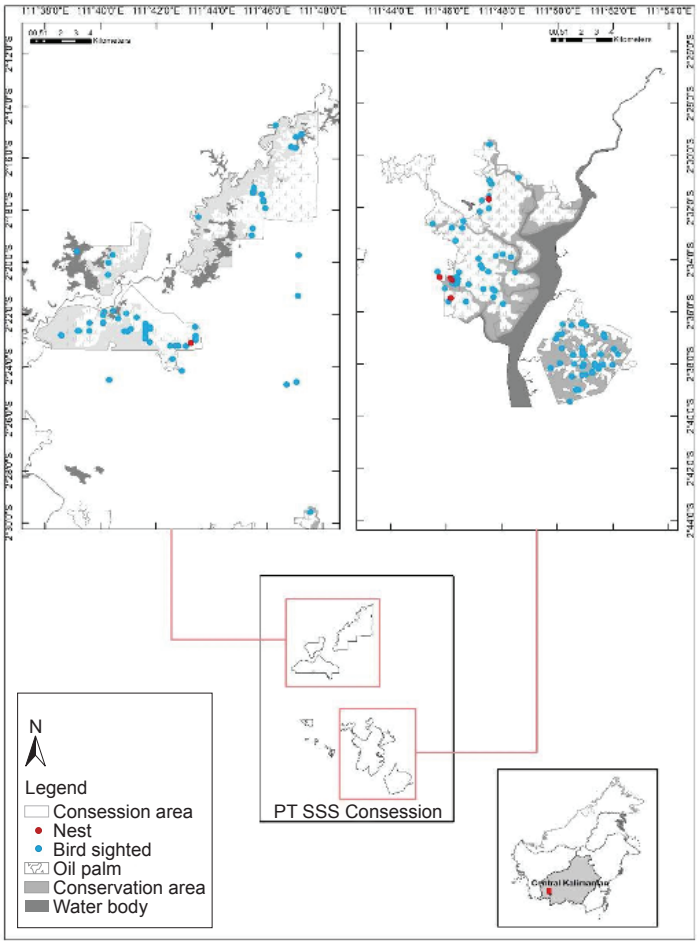


Figure 1. Study location, observation records, and nest locations of the White-throated kingfisher.

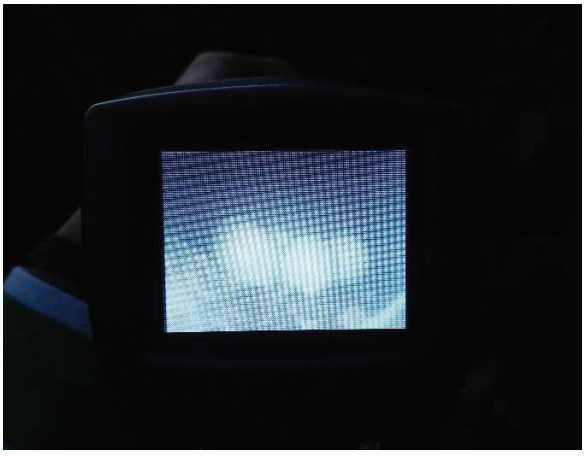
Source: Silmi (2019).

Figure 2. A White-throated kingfisher on its favourite perch site, Lada Estate, Central Kalimantan, Borneo.

Source: Silmi (2019).

Figure 3. Nesting hole at a small earth bank adjacent to staff quarters, Lada Estate, Central Kalimantan, Borneo. The nest was regularly inspected for eggs and chicks.

(a)



(b)

Source: Silmi (2019).

Figure 4. (a) The kingfisher pair produced five eggs and (b) which all successfully hatched.

from the entrance to the nest chamber at 52 cm (*Table 2*). From photographic records, we estimated the nest chamber dimensions at 14-20 cm wide and 12-14 cm high. Only three of seven nests had eggs/chicks in them (*Table 2*). The first record was in a nest at the earth bank in Lada Estate on the 1st of November 2019 (*Figure 4*). On the 29th of November, 2019, a second nesting hole with four chicks was found, estimated at 4-5 days old. Finally, a third nest was found with three eggs on the 1st of December 2019. This differed from the March-April breeding season recorded in Tamil Nadu, India (Ali *et al*., 2010), April-May in Israel (Sela-Klein *et al*., 2023), April-June in Sri Lanka (Prakash *et al*., 2021) and May-June in Pakistan (Rehman *et al*., 2022).

Unfortunately, none of the eggs/chicks survived to fledging age, in all the natural nesting holes. The first nest was raided by a small water monitor lizard, *Varanus salvator*, whereas the second and third nests were excavated by humans (*Figure 5*), who collected the eggs/chicks, likely for breeding and sale in Indonesia's sprawling bird trade (Harris *et al*., 2017; Okarda *et al*., 2022; Sy *et al*., 2022).

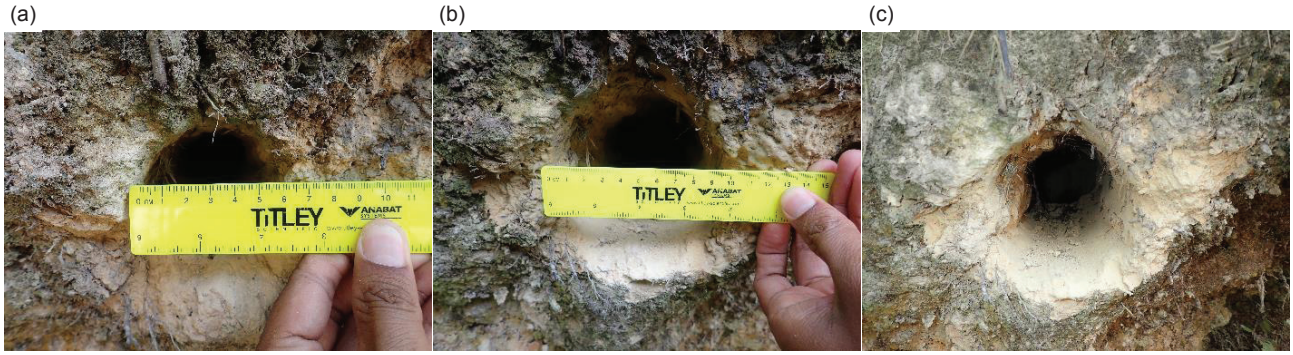
To our knowledge, the observation of breeding White-throated kingfishers is the first of its kind in Indonesian Borneo. The first observed pair successfully produced five chicks (*Figure 4*) and this, combined with the numerous subsequent observations of other individuals dispersed across a large area, suggests that these are more than merely random incidents. The current population density in the study area, however, remains unknown, but considering the species' habitat and dietary flexibility (Burton, 1998; Purandare, 2008; Reza *et al*., 2003; Roberts & Priddy, 1965; Tehsin, 1995; Yahya & Yasmin, 1991) our observations suggest that the species has established a local breeding population. It is also very likely that it can disperse further into Borneo and colonise suitable environments that have emerged following extensive loss of natural

TABLE 1. OBSERVATIONS OF WHITE-THROATED KINGFISHER FROM NOVEMBER 2017-MARCH 2021 IN UP/PTSSS' PALM OIL ESTATES AND ADJACENT AREAS, CENTRAL KALIMANTAN, INDONESIAN BORNEO

Month	Number of bird encounters				
	Year				
	2017	2018	2019	2020	2021
January				7	2
February			1	14	6
March			1	7	2
April			1	6	
May				2	
June				17	
July				27	
August			1	12	
September				14	
October			5	10	
November	1		8	6	
December		2	28	3	
Total	**1**	**2**	**45**	**125**	**10**

TABLE 2. NESTING HOLE CHARACTERISTICS OF WHITE-THROATED KINGFISHER OBSERVED IN UP/PTSSS' PALM OIL ESTATES AND ADJACENT AREAS, CENTRAL KALIMANTAN, INDONESIAN BORNEO

Nest hole	Entrance diameter (cm)	Hole depth (cm)	No. eggs/chicks
1	6.5	52	5 eggs
2	6.0	55	4 chicks
3	5.5	60	3 eggs
4	6.0	57	no egg and no chick
5	5.8	49	no egg and no chick
6	5.7	50	no egg and no chick
7	6.3	47	no egg and no chick
Ave ± SD	**5.97 ± 0.32**	**52.86 ± 4.32**	



Source: Silmi (2019).

Figure 5. (a) A nesting hole before it was raided by humans and (b) after. (c) The hole had clear "cut" marks suggesting it had been excavated by a sharp tool and the size sufficient for an average-sized hand/arm to enter into.

rainforest in the past two decades to agricultural development (Gaveau *et al*., 2018; Meijaard *et al*., 2018). Several "generalist" species such as the Leopard cat, *Priornailurus bengalensis* and Sumatran spitting cobra, *Naja sumatrana* thrive in oil palm landscapes (Rochmyaningsih, 2016; Silmi *et al*., 2013; 2021), due to an abundance of prey and suitable breeding environment (Silmi *et al*., 2021).

The main challenge for reproducing birds appears to be a large number of snake species in the study area, in particular, Sumatran spitting cobra, Bornean short python, *Python breitensteini* and reticulated python, *Malayopython reticulatus* that are known to predate on a wide variety of prey from eels, mammals and birds, including eggs and young chicks (Asad *et al*., 2018; Chakravarty & Isaac, 2013; Manchi & Sankaran, 2009). The plantation also has several other species such, as the water monitor lizard and rats, *Rattus* spp., that are known to prey on either chicks or eggs (Duron *et al*., 2017; Hughes *et al*., 2019; Karunarathna *et al*., 2015; Seto & Conant, 1996; Traeholt, 1993). Indeed, the first recorded nest was raided by a water monitor lizard. In addition, the two other nests with eggs/chicks were excavated by humans and are likely either sold to traders and breeders and/or raised until adulthood for sale (Nijman *et al*., 2022; Rentschlar *et al*., 2018). Indonesia is home to the world's largest domestic bird trade and despite strict laws, illegal trade continues to persist across the archipelago. Four of the seven nest holes were empty. While these showed no signs of human excavation, these could have been raided by natural predators too. Although we need more data to predict the reproductive success of the species, three of seven confirmed failures in this study have a very high loss rate. However, during the post-study period, the species continued to be observed regularly, suggesting that it has successfully colonised the study area and possibly, beyond.

CONCLUSION

The ongoing habitat change following agricultural and urban development challenges many species to adapt to a changing environment. These challenges are amplified by the increasing impact of global warming. For some species, such changes can be disastrous with the risk of driving them into extinction. In contrast, species that exhibit high adaptive behavioural capacity, will gradually increase their distribution range and colonise areas where they were once absent, a decade ago. The species have colonised a variety of habitats from the Far West Asia to Southeast Asia and the Andamans. Our study provides solid evidence that the White-throated kingfisher has managed to colonise our study area and, thereby, expand its distribution range. This allopatric speciation suggests that the species will be able to adapt to climatic changes in the near future. Despite the high reproductive failure rate recorded, the abundance of wetlands, mangrove forests, streams, and plantation canals, teeming with small fish, amphibians, small lizards and insects, combined with streambanks and other potential nest hole sites, offer ideal feeding and reproductive conditions for the species. We anticipate that more breeding records of this species will emerge in the future, along the coastal areas of Kalimantan and inland. We recommend that future studies should focus on reproductive ecology and time activity budget.

ACKNOWLEDGEMENT

The authors wish to thank United Plantations Bhd. for their continued financial and policy support to Biodiversity Conservation; Copenhagen Zoo for technical support and advice and Bjorn Dahlen for practical support concerning equipment procurement.

REFERENCES

Ali, A. M. S., Asokan, S., & Manikannan, R. (2010). Observations on nesting ecology of White-breasted kingfisher *Halcyon smyrnensis* (Aves: Coraciiformes) in Cauvery Delta, Southern India. *Journal of Ecology and the Natural Environment*, *2*(7), 134–139. https://doi.org/10.5897/jene.9000077

Andersen, M. J., McCullough, J. M., Mauck, W. M., Smith, B. T., & Moyle, R. G. (2017). A phylogeny of kingfishers reveals an Indomalayan origin and elevated rates of diversification on Oceanic Islands. *Journal of Biogeography*, *45*(2), 269–281. https://doi.org/10.1111/jbi.13139

Asad, S., Siku, J., Shabrani, A., Wilting, A. & Rödel, M-O (2018). *Naja sumatrana* (Sumatran spitting cobra) diet. *Herpetological Review, 49(1)*: 134–135.

BirdLife International (2017). *Halcyon smyrnensis* (amended version of 2016 assessment). *The IUCN Red List of Threatened Species* 2017: e.T22725846A119289544. https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T22725846A119289544.en

Burton, N. H. K. (1998). Notes on the diet of nestling White-throated kingfishers *Halcyon smyrnensis* in Malaysia. *Forktail, 14*, 79–80.

Chakravarty, R., & Isaac, S. (2013). Observations on *Gonyosoma xycephalum* (Boie, 1827) predating upon cave bats in the Andaman Islands, India. *SAURIA, 36*(2), 55–58.

Duron, Q., Bourguet, E., De Meringo, H., Millon, A., & Vidal, E. (2017). Invasive rats strengthen predation pressure on bird eggs in a South Pacific Island rainforest. *Current Zoology*, *63*(6), 583–590. https://doi.org/10.1093/cz/zox009

eBird (2023). *White-throated kingfisher* Halcyon smyrnensis. Retrieved on August 2023, from https://ebird.org/species/whtkin2

eBird (2024). *White-throated kingfisher* Halcyon smyrnensis. Retrieved on March 2024, from https://ebird.org/species/whtkin2

Gaveau, D. L., Locatelli, B., Salim, M. A., Yaen, H., Pacheco, P., & Sheil, D. (2018). Rise and fall of forest loss and industrial plantations in Borneo (2000-2017). *Conservation Letters*, *12*(3), e12622. https://doi.org/10.1111/conl.12622

Harris, J. B. C., Tingley, M. W., Hua, F., Yong, D. L., Adeney, J. M., Lee, T. M., Marthy, W., Prawiradilaga, D. M., Sekercioglu, C. H., Suyadi, Winarni, N., & Wilcove, D. S. (2016). Measuring the impact of the pet trade on Indonesian birds. *Conservation Biology*, *31*(2), 394–405. https://doi.org/10.1111/cobi.1272

Hughes, B J; Dickey, R C and Reynolds, S J (2019). Predation pressures on sooty terns by cats, rats and common mynas on Ascension Island in the South Atlantic. In C. R. Veitch, M. N. Clout, A. R. Martin, J. C. Russell & C. J. West (Eds.). *Island invasives: Scaling up to meet the challenge (*pp. 295–301). IUCN.

Iswandaru, D., Febryano, I. G., Santoso, T., Kaskoyo, H., Winarno, G. D., Hilmanto, R., Safe'i, R., Darmawan, A., & Zulfiani, D. (2020). Bird community structure of small islands: A case study on the Pahawang Island, Lampung Province, Indonesia. *Silva Balcanica*, *21*(2), 5–18. https://doi.org/10.3897/silvabalcanica.21.e56108

Karunarathna, D. M. S. S., Surasinghe, T. D., De Silva, M. C., Madawala, M. B., Gabadage, D. E., & Botejue, W. M. S. (2015). Dietary habits of *Varanus salvator* in Sri Lanka with a new record of predation on an introduced clown knife fish *Chitala ornata*. *The Herpetological Bulletin, 133*, 23–28.

Manchi, S., & Sankaran, R. (2009). Predators of swiftlets and their nests in the Andaman & Nicobar Islands. *Indian Birds 5*(4), 118–120.

Meijaard, E., Garcia-Ulloa, J., Sheil, D., Wich, S. A., Carlson, K. M., Juffre-Bigroli, D., & Books T. M. (2018). *Oil palm and biodiversity. A situation analysis by the IUCN Oil Palm Task Force*. IUCN.

Rochmyaningsih, D. (2016, October 6). *Indonesian's oil palm plantations are rife with spitting cobras*. Mongabay. https://news.mongabay.com/2016/10/indonesias-oil-palm-plantations-are-rife-with-spitting-cobras/

Nijman, V., Morcatty, T. Q., Feddema, K., Campera, M., & Nekaris, K. A. I. (2022). Disentangling the legal and illegal wildlife trade-insights from Indonesian wildlife market surveys. *Animals*, *12*(5), 628. https://doi.org/10.3390/ani12050628

Okarda, B., Muchlish, U., Kusumadewi, S. D., & Purnomo, H. (2022). Categorizing the songbird market through big data and machine learning in the context of Indonesia's online market. *Global Ecology and Conservation*, *39*, e02280. https://doi.org/10.1016/j.gecco.2022.e02280

Palkar, S. B., Lovalekar, R. J., & Joshi, V. V. (2009). Breeding biology of White-breasted kingfisher *Halcyon smyrnensis*. *Indian Birds, 4*(3), 104–105.

Prakash, T., Jayakody, S., Perera, A., Gamage, R., & Kusuminda, T. (2021). Unusual nesting behaviour of White-throated kingfisher (*Halcyon smyrnensis*). *TAPROBANICA the Journal of Asian Biodiversity*, *10*(1), 64–65. https://doi.org/10.47605/tapro.v10i1.251

Purandare, K. V. (2008). Freak accidental death of a White-breasted kingfisher *Halcyon smyrnensis*. *Indian Birds, 4*(1), 23.

Rehman, E. U., Ahmad, S., Bari, F., Khan, T., Khan, N. U., Khan, A., & Khattak, R. H. (2022). Documenting nesting and breeding ecology with time activity budget of White-throated kingfisher (*Halcyon smyrnensis*) in Swat, Pakistan. *Pakistan Journal of Zoology*, *54*(6), 2845–2850. https://doi.org/10.17582/journal.pjz/20210722100759

Rentschlar, K. A., Miller, A. E., Lauck, K. S., Rodiansyah, M., Bobby, N., Muflihati, N., & Kartikawati, N. (2018). A silent morning: The songbird trade in Kalimantan, Indonesia. *Tropical Conservation Science*, *11*, 1–10. https://doi.org/10.1177/1940082917753909

Reza, A. H. M. A., Feroz, M. M., Islam, M. A., & Kabir, M. M. (2003). Status and density of kingfisher (family: Alcedinidae, halcyonidae, cerylidae) in the Sundarbans mangrove forest, Bangladesh. *Bangladesh Journal of Life Sciences*, *15*(1), 55–60.

Roberts, T. J., & Priddy, C. (1965). Food of the White-breasted kingfisher, [*Halcyon smyrnensis* (Linnaeus)]. *Journal of the Bombay Natural History Society, 62(1)*, 152-153.

Sela-Klein, D., Lavner, Y., & Vortman, Y. (2022). Breeding biology of the White-throated kingfisher *Halcyon smyrnensis smyrnensis*, with emphasis on color and vocalization. *Journal of Ornithology*, *164*(1), 151–161. https://doi.org/10.1007/s10336-022-02026-8

Seto, N. W. H., & Conant, S. (1996). The effects of rat (*Rattus rattus*) predation on the reproductive success of the bonin petrel (*Pterodroma hypoleuca*) on Midway Atoll. *Colonial Waterbirds*, *19*(2), 171–185. https://doi.org/10.2307/1521854

Silmi, M., Mislan, Anggara, S., & Dahlen, B. (2013). Using leopard cats (*Prionailurus bengalensis*) as biological pest control of rats in a palm oil plantation. *Journal of Indonesian Natural History*, *1*(1), 31–36.

Silmi, M., Putra, K., Amran, A., Huda, M., Fanani, A. F., Galdikas, B. M., S, P. A., & Traeholt, C. (2021). Activity and ranging behavior of leopard cats (*Prionailurus bengalensis*) in an oil palm landscape. *Frontiers in Environmental Science*, *9*, 651939. https://doi.org/10.3389/fenvs.2021.651939

Silmi, M. (2019). Lada estate, UP/ PT SSS, Sg. Rangit Jaya, Kota Warisan Barat, Central Kalimantan, Indonesia.

Sy, E. Y., Raymundo, J. J. G., & Chng, S. C. L. (2022). *Farmed or poached? The trade of live Indonesian bird species in the Philippines*. TRAFFIC. https://www.traffic.org/site/assets/files/19606/id-ph_bird-r5-rgb_compressed.pdf

Taufiqurrahman, I., Puwanto, A. A., Tirtaningtyas, F. N., Ade, S., Rachman, M., Daryana, A., Hermawan, A. S., Yordan, K., Emmanuel, B., Kristanto, A., Kiryono, Purnama, S., & Sujatmiko, D. A. (2019). Recent records of White-breasted kingfisher, *Halcyon smyrnensis*, on Java, Indonesia, with notes on its status and distribution. *Birding ASIA, 31*, 74–78.

Tehsin, R. H. (1995). Crab-eating by White-breasted kingfisher *Halcyon smyrnensis* (Linn.). *Journal of the Bombay Natural History Society, 92*(1), 121.

Traeholt, C. (1993). Notes of the feeding behaviour of the water monitor, *Varanus salvator*. *Malayan Nature Journal, 46*, 229–241.

Woodall, P. F., & Kirwan, G. M. (2020). White-throated kingfisher (*Halcyon smyrnensis*), version 1.0. In J. Del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, & E. De Juana, (Eds.). *Birds of the world*. Cornell Lab of Ornithology. https://doi.org/10.2173/bow.whtkin2.01

Yahya, H. S. A., & Yasmin, S. (1991). Earthworms in the dietary of the White-breasted kingfisher, *Halcyon smyrnensis* (Linn.). *Journal of the Bombay Natural History Society, 88*(3), 454.