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First Record of Predation on an Oilfish and a Previously Unknown Cephalopod Prey by a Short-Finned Pilot Whale in East Nusa Tenggara, Indonesia

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Attention to marine mammal stranding events in Indonesia has increased in the last decade. Some efforts have been made to improve the country's stranding responses, including publishing the stranding data online through the Whale Stranding Indonesia website (www.whalestrandingindonesia.com) and conducting training workshops on stranding response. Nevertheless, despite having the second longest coastline in the world (54,716 km; CIA, n.d.), Indonesia has a relatively low number of recorded stranding events. Only 638 stranding events were recorded between 1995 and 2021, an average of 24.5 events per year or 0.012 event per km of coastline. In contrast, the United Kingdom, with only 12,429 km coastline (CIA, n.d.), has had more than 20,000 stranding events since 2013 (*sensu* Coombs et al., 2019)—that is, almost 200 events per year or 0.016 events per km of coastline. Taiwan, with 1,566 km of coastline (CIA, n.d.), had an average of 50 stranding events per year between 1994 and 2013 (Li et al., 2021) or the equivalent of 0.6 events per km of coastline.

Considering the length of Indonesia's coastline, the recorded stranding event trend is likely attributed to the relatively scarce information flow or news coverage and a comparatively lower response effort instead of a true representation of the number of stranding events in the country. Due to this scarcity, any stranding event and its related information deserve prompt investigation.

Between 1996 and 2021, the Whale Stranding Indonesia database included at least 638 recorded marine mammal stranding events, including 48 mass stranding events. The most frequently recorded stranded species in Indonesia are as follows: Irrawaddy dolphins (*Orcaella brevirostris*; mostly along the Mahakam River, East Kalimantan; total 114 events), sperm whales (*Physeter macrocephalus*; 74 events), dugongs (*Dugong dugon*; 71 events), and short-finned pilot whales (*Globicephala macrorhynchus*; 29 events) (Whale Stranding Indonesia, 2022). One sperm whale stranding event was a mass stranding involving 10 animals on 13 November 2017 (ID 333; Whale Stranding Indonesia, 2022). Ten short-finned pilot whale stranding events were mass stranding events involving 322 individuals. Of these 10 mass stranding events, the latest one was a mass stranding of ~52 individuals in the southern part of Madura Island (East Java, Indonesia) on 18 February 2021 (ID 576; Whale Stranding Indonesia, 2022). However, by 2021, only approximately 34 necropsies (5.3% of all marine mammal stranding events) were conducted on stranded marine mammals (all cetaceans), mostly in Bali, East Kalimantan, and Java, thus limiting our understanding of marine mammals in the country (Supplemental Table 1 & Supplemental Figure 1; the Supplemental Material for this paper is available in the "Supplemental Material" section of the *Aquatic Mammals*

Figure 1. (a) The short-finned pilot whale (*Globicephala macrorhynchus*) found on 2 October 2020, with the caudal fin of an oilfish (*Ruvettus pretiosus*) in its mouth (screen shot obtained from a measurement video from Area Conservation Section IV, the Natural Resource Conservation Agency [KSDA], East Nusa Tenggara, Indonesia in Sikka [Live Informasi, 2020]); and (b) a crane was used to reposition the specimen for necropsy and burial on 3 October 2020 (Photo courtesy of Ebed de Rosary, Mongabay, Indonesia).

website: https://www.aquaticmammalsjournal.org/index.php?option=com_content&view=article&id=10&Itemid=147).

On 2 October 2020, a fisher found a freshly dead short-finned pilot whale floating in Sikka waters in East Nusa Tenggara, Indonesia. With the intention to sell, the carcass was towed to shore. However, upon learning that all whales and dolphins are protected in Indonesia, the fisher relinquished the specimen to Area Conservation Section IV of the Natural Resource Conservation Agency (Balai Konservasi Sumber Daya Alam [BKSDA]). A necropsy was later conducted upon the BKSDA's request (Figure 1).

Figure 2. The necropsy process of the short-finned pilot whale (Photos courtesy of the Sikka Agriculture Office)

Table 1. External measurements of the short-finned pilot whale (*Globicephala macrorhynchus*) (following Figure 10.7 of Geraci & Lounsbury, 2005)

Aspect	Length (cm)	Measurement remarks
Total length	430	From the start of the melon to the notch of the tail
Pectoral fin length (left)	76	From the anterior insertion of the pectoral fin to the tip of the pectoral fin, diagonal line; the right pectoral fin was not measured.
Abdominal girth	110	From the anterior insertion of the dorsal fin, around the stomach cavity

Note: All aspects measured with a stiff tradesman tape measure (Live Informasi, 2020). The dorsal fin height (component #15 of Geraci & Lounsbury [2005], Figure 10.7) is not provided because it was measured incorrectly.

Local veterinarians from the Sikka Agriculture Office, the Animal Health Division, conducted the necropsy at Urunpigan, Wailiti, West Alok, Sikka Regency, East Nusa Tenggara, on 3 October 2020. Due to the unexpected nature of the event, the team was not equipped with proper marine mammal necropsy tools, except for some personal protective equipment (PPEs) for their protection (Figure 2). External examination of the carcass was conducted in right lateral recumbency.

The animal was male with a total length of 430 cm (Table 1). The carcass condition was fresh (Code 2) (Geraci & Lounsbury, 2005). There were several lacerations on the ventral part of the body and fluke and scratches and lacerations around the mouth. Ecchymosis was found on the tongue. The caudal fin or tail of a fish could be seen protruding from the partly opened mouth. The fish, identified as an oilfish (*Ruvettus pretiosus*), was 1 m long and 20 cm wide (Figures 1a & 3). Two incisions at the mandibular and abdominal regions were made on the pilot whale carcass. Upon making an incision at the upper and lower left mandibular joint, the oilfish was found lodged tightly inside the pharynx and could not be extracted. In the absence of proper cutting instruments, the veterinarians could not proceed further. A skin sample from the ventral lateral area near the peduncle was collected and preserved in formaldehyde, hence not useful for further genetic analysis.

An incision was made in the abdominal region to expose the main stomach and the gastro-intestinal organs. The lining of the stomach was unremarkable with no observed lesions. The following prey were found: another undigested whole oilfish (no measurement was taken for this prey), partially digested fish (suspected oilfish), and two large squid of ~80 cm long, including appendages (Figure 4), with an estimated squid mantle length of ~55 cm. Based on available video and photographs, and upon consultation with Dr John Bower from Hokkaido University, the squid were confirmed to be diamond-back squid (*Thysanoteuthis rhombus*; Figure 4). No foreign objects such as plastics were found. A necropsy video is available in the Supplemental Material.

The intestines were partially filled with digested prey, and the linings were unremarkable with no observed lesions. Due to time constraints and logistical limitations, no further examination was conducted, and no samples were taken. Based on these findings, the probable cause of death is asphyxiation due to obstruction of the upper airway. We could not ascertain whether the fish dislodged the goose beak or blocked the nasal passage because the necropsy was only partially completed. However, there have been some precedents where the prey was found lodged inside the esophagus, and asphyxiation was postulated as the cause of death (Elliser et al., 2020).

To our knowledge, del Carmen García-Rivas et al. (2014) is the only prior report on oilfish-related asphyxiation in short-finned pilot whales, and odontocetes in general, while no prior report of short-finned pilot whale consumption of diamond-back squids was found. No publication of short-finned pilot whale prey is available for Southeast Asian waters either. Thus, our report sheds some important light into the ecology of these species, particularly in Southeast Asia.

Short-finned pilot whales can grow to 7.3 m (Carwardine, 2020), with subadults reaching 5 m (Shirihai & Jarrett, 2006); thus, our specimen was likely a subadult. Predominant prey items of this species are squid, octopus, and fish (Shirihai & Jarrett, 2006; Mintzer et al., 2008; Carwardine, 2020). In the western North Atlantic, short-finned pilot whales mostly feed on deep-water species and would mostly feed off the continental shelf prior to stranding (Mintzer et al., 2008). This species is found in open nearshore areas adjacent to deep water, specifically 0 to 15 km to the 1,000 m isobath (Putra & Mustika, 2020); the maximum dive record was 1,019 m (Soto et al., 2008). This species is also believed to be capable of a "deep sprints" tactic to catch fast moving prey such as giant squid

Figure 3. One of the two oilfish inside the stomach of the short-finned pilot whale. Screen shots were obtained from the necropsy video from the Sikka Agriculture Office. The video is available in the Supplemental Material for this paper.

(Soto et al., 2008). Since diamond-back squids usually inhabit epipelagic and upper mesopelagic depths up to 800 m (Jereb & Roper, 2010), its consumption corroborates short-finned pilot whales as deep-water foragers in Southeast Asia and makes this record the first record of a diamond-back squid predation by short-finned pilot whale.

Due to the scant literature of the feeding mechanism of short-finned pilot whales, we examined the feeding mechanism of long-finned pilot whales (*Globicephala melas*) to better understand this lethal predation. The long-finned pilot whales are suspected to be suction feeders, using their hyoid and tongue to create a negative pressure within the mouth to capture prey (Werth, 2000; Johnston & Berta, 2011). Since our necropsy revealed the relatively intact features of the oilfish and the diamond-back squids (Figures 3 & 4), short-finned pilot whales are also likely "'capture' suction feeders" (*sensu* Johnston & Berta, 2011, p. 493), although more investigations are needed to confirm this hypothesis.

The oilfish is a temperate and tropical marine benthopelagic fish species that is either solitary or found in pairs near the sea floor (Gomez, 2019), with lengths between 53 to 139 cm (Acarli et al., 2017; Gomez, 2019). Oilfish are deep-water dwellers, found in the 65 to 700 m isobath (Nakamura & Parin, 1993; Acarli et al., 2017). Since short-finned pilot whales can dive up to 1,019 m (Soto et al., 2008), it is plausible that the Sikka pilot whale might have encountered its two oilfish prey while deep-water foraging.

Oilfish have been recorded several times in the stomachs of sperm whales (Best, 1999). Roughly three times the size of a pilot whale, sperm whales are large enough to handle a sizeable oilfish.

Figure 4. The two diamond-back squids (*Thysanoteuthis rhombus*) inside the stomach of the short-finned pilot whale (*Photo credits:* Photos a, b, and c were screen shots of the necropsy video from the Sikka Agriculture Office [the video is available in the Supplemental Material]; and photo d is courtesy of Area Conservation Section IV, KSDA, East Nusa Tenggara, Indonesia in Sikka)

However, consumption of such a large-sized oilfish can be lethal to smaller cetaceans such as short-finned pilot whales (del Carmen García-Rivas et al., 2014). In our case, the short-finned pilot whale swallowed the fish whole, which could have led to the large prey fish becoming lodged in the pharynx and cranial esophagus. The large size of the oilfish could cause obstruction and compression of the esophagus, blocking the larynx, compromising the airway, and leading to asphyxiation and death soon after feeding.

Asphyxiation of other odontocetes due to other prey has been observed. Dolphin deaths due to upper airway obstruction have been well-documented in common bottlenose (*Tursiops truncatus*) and Indo-Pacific bottlenose (*Tursiops aduncus*) dolphins (Byard et al., 2010; Stolen et al., 2013; Stephens et al., 2017). A common bottlenose dolphin died after consuming a black margate (*Anisotremus surinamensis*), which dislodged the dolphin's larynx, resulting in an agonal death (Mignucci-Giannoni et al., 2009). Another common bottlenose dolphin died after consuming a slender-spined porcupine fish (*Diodon nichthemerus*) due to an upper airway obstruction (both the posterior pharynx and upper esophagus; Byard et al., 2010). Asphyxiation was identified in 14 common bottlenose dolphins for which the fish lodged in the esophagus were associated with a dislocated and obstructed or compressed larynx (Stolen et al., 2013). Other cetaceans have had their fair share of lethal predation as well. Consumption of common soles (*Solea solea*) caused fatal asphyxiation in long-finned pilot whales (IJsseldijk et al., 2015). A beluga whale (*Delphinapterus leucas*) died due to asphyxiation of a starry flounder (*Platichthys stellatus*; Rouse et al., 2018), and harbor porpoise (*Phocoena phocoena*) deaths were linked to asphyxiation of American shad (*Alosa sapidissima*; Elliser et al., 2020) and flatfish (Gross et al., 2020).

The information presented in this paper would have been lost without the initiative of the local BKSDA office and local veterinarians. However, only one measurement of the prey items was available (i.e., of the oilfish lodged in the mouth), and the method of morphometric measurements of the carcass was not clear. Measurements were taken with a stiff tradesman tape measure, thus adding to possible measurement errors. No further examination or sampling was conducted on other organs, and no stomach or gastro-intestinal tract contents analyses were conducted. The skin sample collected for genetic analysis was preserved in formaldehyde, rendering it useless for analysis. These issues are linked to the impromptu nature of the necropsy. This obstacle might have been improved had the team received proper training on how to conduct a necropsy on a marine mammal and other marine megafauna. Thus, this paper emphasizes the importance of improving local capacity in conducting necropsies, including training workshops on collecting morphometrics and writing necropsy reports specifically for marine mammals.

This paper also highlights the governance overlap within marine mammal conservation management in Indonesia. The stranding network was handled by the Ministry of Marine Affairs and Fisheries, the veterinarians were from the Ministry of Agriculture, and general marine mammal species conservation is still handled by the Ministry of Forestry. Despite the presence of the Indonesian stranding network, trained personnel to respond to live and dead strandings are few. Even fewer individuals are trained to conduct necropsies. Standardized protocols for data and sample collection are either insufficient or not widely disseminated. Funding limitations also restrict the ability to collect, preserve, and transport samples for analysis.

More training on marine mammal stranding response and investigation is vital. Due to the generally insufficient ecological data on marine mammals in Southeast Asia, it must be emphasized that any data, including from strandings, is valuable. Spatial and temporal data on occurrences of marine mammals alive or dead, at sea or stranded, would be very helpful for future management decisions. Communications and negotiations must be made to ensure that future stranding events are sampled as extensively as possible. More thorough investigations on gastro-intestinal contents during necropsies would improve our understanding of the ecology of the cetacean species and their prey.

Finally, raising awareness on proper stranding response methods for human and animal safety is crucial for the success of marine mammal stranding networks in developing countries. Indonesia has two ends of the spectrum in terms of responding to stranded marine mammals. At one end of the spectrum, spectators were riding on stranded animals and taking selfies on or around stranded animals (live and dead alike) ("Three Pilot Whales Survive Mass Stranding," 2021). At the opposite end of the spectrum, we have Good Samaritans wanting to help the stranding response. We see that the presence of an active stranding network does increase public awareness. Thus, raising awareness on proper stranding response methods for the safety of the animals and the people alike is critical for the success of marine mammal stranding networks in developing countries, particularly in Southeast Asia.

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Literature Cited

Acarli, D., Altinağaç, U., Özekinci, U., & Bayhan, B. (2017). The first record of the oilfish *Ruvettus pretiosus* Cocco, 1833 (Pisces: Gempylidae) from the Sea of Marmara, Turkey. *Oceanological and Hydrobiological Studies*, *46*(2), 249-252. https://doi.org/10.1515/ohs-2017-0026

Best, P. B. (1999). Food and feeding of sperm whales *Physeter macrocephalus* off the west coast of South Africa. *African Journal of Marine Science*, *21*(1), 393-413. https://doi.org/10.2989/025776199784126033

Byard, R. W., Tomo, I., Kemper, C. M., Gibbs, S. E., Bossley, M., Machado, A., & Hill, M. (2010). Unusual causes of fatal upper aerodigestive tract obstruction in wild bottlenose dolphins (*Tursiops aduncus*). *Forensic Science, Medicine, and Pathology*, *6*(3), 207-210. https://doi.org/10.1007/s12024-010-9143-3

Carwardine, M. (2020). *Handbook of whales, dolphins and porpoises*. Bloomsbury. 528 pp.

CIA. (n.d.). *The world factbook*. https://www.nationsencyclopedia.com/WorldStats/CIA-World-Factbook-Coastline.html

Coombs, E. J., Deaville, R., Sabin, R. C., Allan, L., O'Connell, M., Berrow, S., Smith, B., Brownlow, A., Ten Doeschate, M., Penrose, R., Williams, R., Perkins, M. W., Jepson, P. D., & Cooper, N. (2019). What can cetacean stranding records tell us? A study of UK and Irish cetacean diversity over the past 100 years. *Marine Mammal Science*, *35*(4), 1527-1555. https://doi.org/10.1111/mms.12610

del Carmen García-Rivas, M., Schmitter-Soto, J. J., & Pérez-Flores, J. (2014). Fatal predation of oilfish, *Ruvettus pretiosus* (Gempylidae), by a young short-finned pilot whale, *Globicephala macrorhynchus* (Delphinidae). *UNED Research Journal/Cuadernos de Investigación UNED*, *5*(2), 231-233. https://doi.org/10.22458/urj.v5i2.268

Elliser, C. R., Calambokidis, J., D'Alessandro, D. N., Duffield, D. A., Huggins, J. L., Rice, J., Szczepaniak, I., & Webber, M. (2020). Prey-related asphyxiation in harbor porpoises (*Phocoena phocoena*) along the U.S. West Coast: Importance of American shad (*Alosa sapidissima*) on adult female harbor porpoise mortality. *Oceans*, *1*(3), 94-108. https://doi.org/10.3390/oceans1030008

Geraci, J. R., & Lounsbury, V. J. (2005). *Marine mammals ashore: A field guide for strandings* (2nd ed.). National Aquarium in Baltimore.

Gomez, B. C. (2019). Growth pattern and size of oilfish, *Ruvettus pretiosus* (Cocco, 1833) landed in southwestern coast of Surigao del Norte, Philippines. *International Journal of Fisheries and Aquatic Studies*, *7*(4, Part B), 126-128.

Gross, S., Roller, M., Haslob, H., Grilo, M., Lakemeyer, J., Reckendorf, A., Wohlsein, P., & Siebert, U. (2020). Spatiotemporal accumulation of fatal pharyngeal entrapment of flatfish in harbour porpoises (*Phocoena phocoena*) in the German North Sea. *PeerJ*, *8*, e10160. https://doi.org/10.7717/peerj.10160

IJsseldijk, L. L., Leopold, M. F., Bravo Rebolledo, E. L., Deaville, R., Haelters, J., IJzer, J., Jepson, P. D., & Gröne, A. (2015). Fatal asphyxiation in two long-finned pilot whales (*Globicephala melas*) caused by common soles (*Solea solea*). *PLOS ONE*, *10*(11), e0141951. https://doi.org/10.1371/journal.pone.0141951

Jereb, P., & Roper, C. F. E. (Eds.). (2010). *Cephalopods of the world: An annotated and illustrated catalogue of cephalopod species known to date: Volume 2. Myopsid and Oegopsid squids* (*FAO Species Catalogue for Fishery Purposes*, No. 4). Food and Agriculture Organization of the United Nations. 605 pp.

Johnston, C., & Berta, A. (2011). Comparative anatomy and evolutionary history of suction feeding in cetaceans. *Marine Mammal Science*, *27*(3), 493-513. https://doi.org/10.1111/j.1748-7692.2010.00420.x

Li, W-T., Chou, L-S., Chiou, H-Y., Chen, I-H., & Yang, W-C. (2021). Analyzing 13 years of cetacean strandings: Multiple stressors to cetaceans in Taiwanese waters and their implications for conservation and future research. *Frontiers in Marine Science*, *8*, 606722. https://doi.org/10.3389/fmars.2021.606722

Live Informasi. (2020). *Ikan PAUS PILOT sirip pendek BERAT 1 TON terdampar di Maumere 02/10/2020* [A 1 ton short-finned pilot whale stranded in Maumere 02/10/2020]. YouTube [Video]. https://www.youtube.com/watch?v=6Yz0e0s2BH0

Mignucci-Giannoni, A. A., Rosario-Delestre, R. J., Alsina-Guerrero, M. M., Falcón-Matos, L., Guzmán-Ramírez, L., Williams, E. H., Bossart, G. D., & Reidenberg, J. S. (2009). Asphyxiation in a bottlenose dolphin (*Tursiops truncatus*) from Puerto Rico due to choking on a black margate (*Anisotremus surinamensis*). *Aquatic Mammals*, *35*(1), 48-54. https://doi.org/10.1578/AM.35.1.2009.48

Mintzer, V. J., Gannon, D. P., Barros, N. B., & Read, A. J. (2008). Stomach contents of mass-stranded short-finned pilot whales (*Globicephala macrorhynchus*) from North Carolina. *Marine Mammal Science*, *24*(2), 290-302. https://doi.org/10.1111/j.1748-7692.2008.00189.x

Nakamura, I., & Parin, N. V. (1993). Snake mackerels and cutlassfishes of the world (families Gempylidae and Trichiuridae). *FAO Fisheries Synopsis*.

Putra, M. I. H., & Mustika, P. L. K. (2020). Maximum entropy model: Estimating the relative suitability of cetacean habitat in the northern Savu Sea, Indonesia. *Marine Mammal Science*, *37*(1), 6-28. https://doi.org/10.1111/mms.12719

Rouse, N., Burek-Huntington, K. A., & Shelden, K. E. W. (2018). Asphyxiation of an endangered Cook Inlet beluga whale, *Delphinapterus leucas*. *Marine Fisheries Review*, *79*(2), 38-43. https://doi.org/10.7755/MFR.79.2.3

Shirihai, H., & Jarrett, B. (2006). *Whales, dolphins and seals: A field guide to the marine mammals of the world*. A & C Black, London. 384 pp.

Soto, N. A., Johnson, M. P., Madsen, P. T., Díaz, F., Domínguez, I., Brito, A., & Tyack, P. (2008). Cheetahs of the deep sea: Deep foraging sprints in short-finned pilot whales off Tenerife (Canary Islands). *Journal of Animal Ecology*, *77*(5), 936-947. https://doi.org/10.1111/j.1365-2656.2008.01393.x

Stephens, N., Duignan, P., Symons, J., Holyoake, C., Bejder, L., & Warren, K. (2017). Death by octopus (*Macroctopus maorum*): Laryngeal luxation and asphyxiation in an Indo-Pacific bottlenose dolphin (*Tursiops aduncus*). *Marine Mammal Science*, *33*(4), 1204-1213. https://doi.org/10.1111/mms.12420

Stolen, M., St. Leger, J., Durden, W. N., Mazza, T., & Nilson, E. (2013). Fatal asphyxiation in bottlenose dolphins (*Tursiops truncatus*) from the Indian River Lagoon. *PLOS ONE*, *8*(6), e66828. https://doi.org/10.1371/journal.pone.0066828

Three pilot whales survive mass stranding in Indonesia. (2021). *Borneo Bulletin*. https://borneobulletin.com.bn/three-pilot-whales-survive-mass-stranding-in-indonesia

Werth, A. (2000). A kinematic study of suction feeding and associated behavior in the long-finned pilot whale, *Globicephala melas* (Traill). *Marine Mammal Science*, *16*(2), 299-314. https://doi.org/10.1111/j.1748-7692.2000.tb00926.x

Whale Stranding Indonesia. (2022). *Stranding database*. www.whalestrandingindonesia.com/new-database.html