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Caption: Large Indian Civet *Viverra zibetha*, Tricoloured Munia *Lonchura malacca* and *Hoya wightii* (Medium—pencil crayon on watercolour paper) © Supriya Samanta.



Photographic record of Dholes preying on a young Banteng in southwestern Java, Indonesia

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Abstract: A long-term camera-trap study of the Javan Rhinoceros in 2013 in Ujung Kulon National Park (UKNP), Indonesia, allowed us to document the first photographic evidence of Dholes preying on a young Banteng and other species. Our photographs suggested that Dholes get in large packs to predate on Banteng and commonly separate young from adults when attacking the young. Future research should examine the Dhole diet and interspecific relationships between Dhole and Banteng to gain a better understanding of the ecological impacts of endangered predators on endangered prey in UKNP.

Keywords: *Bos javanicus*, camera trap, *Cuon alpinus*, ecological impacts, Indonesia, interspecific relationships, predation.

Historically, Dholes *Cuon alpinus* occurred throughout southern Asia (Bangladesh, Bhutan, India, Nepal, and Pakistan), eastern Asia (China, Korean Peninsula, Russian Far East), and southeastern Asia (Cambodia, Lao PDR, Malaysia, Myanmar, Thailand, Viet Nam, and Indonesia), and as far west as the mountains ranging from eastern Kazakhstan to northern Pakistan (Heptner & Naumov 1967). Recently, most of the Dhole's population has been fragmented and continues to decline (they now occur in <25% of their historical range) and therefore

the species is categorized as 'Endangered' by the IUCN Red List (Kamler et al. 2015). In Indonesia, historically, Dholes occurred throughout both Sumatra and Java; however, their current distribution on both islands has contracted considerably during the past 30 years; consequently, the species is protected by Indonesian law (Regulation of the Minister of Environment and Forestry of the Republic of Indonesia No. P.106/MENLHK/SETJEN/KUM.1/12/2018; Indonesian Ministry of Environment and Forestry 2018).

Despite their endangered status and widespread distribution, there is still relatively little known about the ecology of Dholes in Indonesia. For example, there have been only nine studies that determined the daily behavior and feeding habits of Dholes in Indonesia (Pudyatmoko et al. 2007; Nurvianto et al. 2015, 2016; Pudyatmoko 2017, 2018; Rahman et al. 2018, 2019; Rahman & Mardiastuti 2021). Some of these studies have described potential prey for Dholes in two protected areas (Baluran National Park and Ujung Kulon National Park), but evidence of predation behaviour through

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direct observation or camera footage has not been reported. Our study is the first to document predation activity by Dholes on a large-sized ungulate species, the Banteng *Bos javanicus* in Ujung Kulon National Park.

METHODS

Study area

Our study area was located in Ujung Kulon National Park (UKNP) in southwestern Java, Indonesia (Figure 1). We conducted long-term camera-trap surveys in the peninsula of UKNP (323 km²). The park biota is a tropical rainforest that has experienced various natural and anthropogenic disturbances in the past and present. The destructive tsunami in 1883 and landslides in 2018 in the Sunda Strait have caused secondary growth of biota in the Park. The UKNP contains the last known population of Javan Rhinoceros *Rhinoceros sondaicus sondaicus*.

The UKNP also contains only one other large-sized ungulate, the Banteng, as well as small- to medium-sized ungulates such as Java Mouse-deer *Tragulus javanicus*, Javan Warty Pig *Sus verrucosus*, Eurasian Wild Pig *Sus scrofa*, Red Muntjac *Muntiacus muntjak*, and Javan Deer *Rusa timorensis*. Large carnivores present in UKNP include the Javan Leopard *Panthera pardus melas* and Dhole (Rahman et al. 2018, 2020).

Field methods

The sampling effort was 39,420 trap days with a grid of 329 1-km² trap stations. We placed 108 camera units into 134 trap stations, with 0.3–0.5 km between stations, and ran them from January to December 2013. We used two models of camera traps—Bushnell Trophy Cam 119467 and Bushnell Trophy Cam 119405. At each station, we placed single camera and at approximately

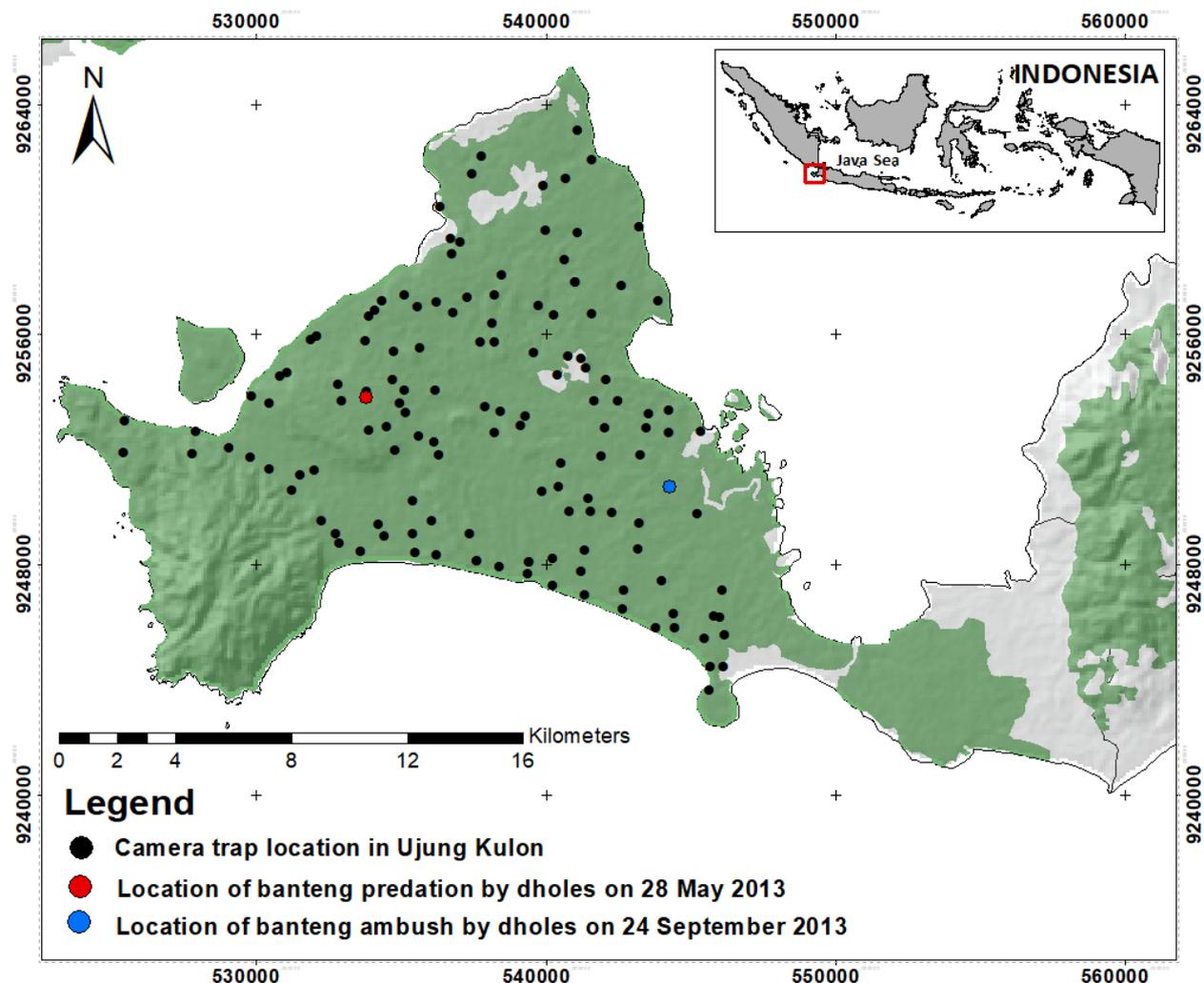


Figure 1. Camera trap locations in Ujung Kulon National Park in southwestern Java with the location of the apparent predation on a young Banteng by Dholes.

170 cm height from ground level with a 10–20 degree angle directed towards the ground (the cameras were set at 1-minute video mode with 1-minute intervals). We checked camera traps every 28–30 days to avoid data loss due to possible camera malfunction and battery and memory card depletion. We moved the camera traps within the same grid when they did not capture any animal (zero presence) after two or three checking. Sequential frames of the same species were counted as an independent photographic event if they were >30 minute apart. We recorded 607 independent photographs of Dholes during a survey period. We used latitude and longitude information converted into digital data in GIS using the ArcMap program to map each photograph location.

RESULTS

On 28 May 2013 at 0743–0757 h, a camera recorded a young Banteng, accompanied by three adult females, attacked and preyed upon by more than 15 adult Dholes (Image 1). On 24 September 2013 at 1700–1712 h, another camera recorded more than six adult Dholes trying to kill a young Banteng (accompanied by 3 adult females) in the same pattern as before (Image 2). The only other video of Dhole-ungulate interactions was of

a Java Mouse-deer being chased by five adult Dholes on 18 April at 1216 h, a wild pig attacked by two adult Dholes on 15 October at 1110 h, and one adult male Javan Rhinoceros being followed by three adult Dholes on 31 July at 1643 h (Image 3).

DISCUSSION

These photographs indicate that Dholes are capable of predating on large-sized ungulates such a Banteng, although probably mostly young of this species. A review of Dhole diets showed that their preferred weight range is 130–190 kg, and that the two most preferred species are Sambar and Chital (Hayward et al. 2014). These results are supported by research in India, such as in Nagarahole, which found Dholes usually prefer medium-sized prey (Karanth & Sunquist 2000), such as Chital Deer *Axis axis* and Sambar Deer *Rusa unicolor* (Karanth & Sunquist 1995). In India, Dholes were occasionally found to consume Gaur *Bos gaurus*, a large-sized ungulate (Johnsingh 1983; Karanth & Sunquist 1995; Hayward et al. 2014), indicating large-sized ungulates are not common prey of Dholes in India. In Bhutan and Laos, Dholes were found to prey mostly on both medium and small-sized ungulates (Wang & Macdonald 2009; Thinley et al. 2011; Kamler



Image 1. Photographs of predation on a young Banteng by a pack of Dholes on 28 May 2013: 1—a Dhole bites the neck of a young Banteng | 2–4—an adult female Banteng tries to protect the young Banteng | 5—several members of the Dhole pack try to separate the young Banteng from an adult female Banteng | 6–7—Dholes kill a young Banteng on the far side of picture | 8—adult female Bantengs come back to try and save the young Banteng | 9—the process of predation by Dholes is complete which is marked by several pack members resting.



Image 2. Photographs of predation on a young Banteng by a pack of Dholes on 24 September 2013: 1—young Banteng accompanied by three adult females | 2—one individual Dhole starts attacking the Banteng | 3–5—an adult female Banteng tries to protect the young Banteng | 6–8—three Dholes are moving forward and attacking Banteng on the far side of picture | 9—another individual Dhole running moving forward on the same side.

et al. 2012). In Cambodia, although Dholes preferred Muntjac, a small-sized ungulate, they also regularly consumed Banteng (18% of diet), indicating Dholes are capable of sometimes preying on large-sized ungulates (Kamler et al. 2020). Similarly, in Baluran National Park, East Java, Dholes were found to consume mostly large-sized ungulates including Banteng and Water Buffalo *Bubalus bubalis* (Nurvianto et al. 2016). Thus, Dholes in Indonesia and other areas of southeastern Asia might be more likely to prey on large-sized ungulates compared to Dholes in India, where medium-sized ungulates are more common.

Dholes may hunt alone, in pairs or large packs (Cohen 1977; Venkataraman et al. 1995), and we recorded similar group sizes in UKNP. Previous studies have shown that larger pack sizes of Dholes take larger prey (Hayward et al. 2014; Kamler et al. 2020), and our photographs supported this conclusion because a pack of at least 15 Dholes were involved in the predation event on the young Banteng. Previous researchers have reported that Dholes attack young of Banteng, Gaur, and Water Buffalo by chasing the herds and separating calves from their mothers (Krishnan 1972; Prater 1980). In our case, the Dhole pack attacked the calf while it was still next to its presumed mother, although during

the attack the Dholes appeared to try and separate the young from its mother. A throat injury typically is not part of a Dhole hunting technique (Johnsingh 1983), although in our case a Dhole first grabbed the young Banteng by the throat in an attempt to bring it to the ground. The estimated time of the predation event (from contact to killing) was approximately 14 minutes.

Although three Dholes were photographed following an adult male Javan Rhinoceros, this probably was not a predation attempt. Firstly, adult male Javan Rhinoceros' weigh approximately 1,000–2,000 kg, which is far outside of accessible prey range for Dholes (30–235 kg; Hayward et al. 2014). Secondly, only three Dholes were following the Rhinoceros, suggesting the pack size was not large enough to successfully attack such a large-sized prey. It is unclear why the three Dholes appeared to be following the male Rhinoceros, but perhaps they were escorting the Rhinoceros away from their young pups or den site. Our frame shows results in line that Dhole activity in denning increases at dawn and dusk.

In summary, we provide the first photographic evidence of a predation on Banteng by Dholes. Although previous studies found that Dholes regularly consumed Banteng in Cambodia (Kamler et al. 2020) and East Java (Nurvianto et al. 2016), their predatory behavior



Image 3. 1–3—a Java Mouse-deer being chased by five adult Dholes | 4–6—Wild Pig attacked by two adult Dholes | 7–9—an adult male Javan Rhinoceros followed by three Dholes.

towards Banteng had never been photographed. These photographs suggests that Dholes get in large packs to predate on Banteng and separate young from adults when attacking the young. We do not know the Dhole diet in UKNP, nor do we know the impact of Dhole predation on the local Banteng population. Since both are threatened species, to protect potentially impacted resources, understanding the dynamics of destructive species can lead to more efficient and effective strategies (e.g., Knowlton et al. 1999). Just because a predator is identified as harming an endangered species, managing predators does not guarantee to help the conservation of an endangered prey to be more effective, efficient or cost-effective. A thorough understanding of when and why predation occurs and the conditions that make endangered prey most susceptible to predation is necessary for predator management by UKNP managers. The mitigation program in the future can be carried out by the manager by optimizing the management of predators during the state of greatest vulnerability of endangered prey and maximizing the conservation benefit-cost ratio in species management.

REFERENCES

Cohen, J.A. (1977). A review of the biology of the Dhole or Asiatic Wild Dog (*Cuon alpinus* Pallas). *Animal Regulation Studies* 1: 141–158.

Hayward, M.W., S. Lyngdoh & B. Habib (2014). Diet and prey preference of Dholes (*Cuon alpinus*): dietary competition within Asia’s apex predator guild. *Journal of Zoology* 294: 255–266. <https://doi.org/10.1111/jzo.12171>

Heptner, V.G. & N.P. Naumov (1967). *Mammals of the Soviet Union*. Vysshaya Shkola Publishers, Moscow.

Johnsingh, A.J.T. (1983). Large mammalian prey-predators in Bandipur. *Journal of the Bombay Natural History Society* 80: 1–57.

Kamler, J.F., A. Johnson, C. Vongkhamheng & A. Bousa (2012). The diet, prey selection, and activity of Dholes (*Cuon alpinus*) in northern Laos. *Journal of Mammalogy* 93(3): 627–633. <https://doi.org/10.1644/11-MAMM-A-241.1>.

Kamler, J.F., N. Songsasen, K. Jenks, A. Srivathsa, L. Sheng & K. Kunkel (2015). *Cuon alpinus*. The IUCN Red List of Threatened Species 2015: e.T5953A72477893. <https://doi.org/10.2305/IUCN.UK.2015-4.RLTS.T5953A72477893.en>

Kamler, J.F., K. Thatdokkham, S. Rostro-García, A. Bousa, A. Caragiulo, R. Crouthers, V. In, C. Pay, C. Pin, S. Prum, C. Vongkhamheng, A. Johnson & D.W. Macdonald (2020). Diet and prey selection of Dholes in evergreen and deciduous forests of Southeast Asia. *Journal of Wildlife Management* 84: 1396–1405. <https://doi.org/10.1002/jwmg.21931>

Karanth, K.U. & M.E. Sunquist (1995). Prey selection by tiger, leopard and Dhole in tropical forests. *Journal of Animal Ecology* 64: 439–450. <https://doi.org/10.2307/5647>

Karanth, K.U. & M.E. Sunquist (2000). Behavioral correlates of predation by Tiger (*Panthera tigris*) Leopard (*Panthera pardus*) and Dhole (*Cuon alpinus*) in Nagarahole, India. *Journal of Zoology* 250(2): 255–265. <https://doi.org/10.1111/j.1469-7998.2000.tb01076.x>

Knowlton, F.F., E.M. Gese & M.M. Jaeger (1999). Coyote depredation control: An interface between biology and management. *Journal of Range Management* 52(5): 398–412. <https://doi.org/10.2307/4003765>

Krishnan, M. (1972). An ecological survey of the larger mammals of peninsular India. *Journal of the Bombay Natural History Society* 69: 42–47.



- Ministry of Environment and Forestry (2018).** Peraturan Menteri Lingkungan Hidup dan Kehutanan Republik Indonesia No. P.106/MENLHK/SETJEN/KUM.1/12/2018 tentang perubahan kedua atas peraturan Menteri Lingkungan Hidup dan Kehutanan No. P.20/MENLHK/SETJEN/KUM.1/6/2018 tentang jenis tumbuhan dan satwa yang dilindungi. Sekretariat Kabinet RI, Jakarta, Indonesia.
- Nurvianto, S., M.A. Imron & S. Herzog (2015).** The influence of anthropogenic activities and availability of prey on the distribution of Dholes in a dry deciduous forest of East Java, Indonesia. *Asian Journal of Conservation Biology* 4(1): 26–36.
- Nurvianto, S., R. Eprilurahman, M.A. Imron & S. Herzog (2016).** Feeding habits of pack living Dhole (*Cuon alpinus*) in a dry deciduous forest of East Java, Indonesia. *Taprobanica* 8(1): 10–20. <https://doi.org/10.47605/tapro.v8i1.210>
- Prater, S.H. (1980).** *The Book of Indian Animals*. Bombay Natural History Society, Revised ed. 316 pp.
- Pudyatmoko, S., Djuwantoko & Y. Sabarno (2007).** Evidence of Banteng (*Bos javanicus*) decline in Baluran National Park, Indonesia. *Journal of Biological Sciences* 7(6): 854–859. <https://doi.org/10.3923/jbs.2007.854.859>
- Pudyatmoko, S. (2017).** Free-ranging livestock influence species richness, occupancy, and daily behaviour of wild mammalian species in Baluran National Park, Indonesia. *Mammalian Biology* 86: 33–41. <https://doi.org/10.1016/j.mambio.2017.04.001>
- Pudyatmoko, S. (2018).** Spatiotemporal inter-predator and predator-prey interactions of mammalian species in a tropical savanna and deciduous forest in Indonesia. *Mammal Research* 64: 191–202. <https://doi.org/10.1007/s13364-0180391-z>
- Rahman, D.A., P. Rianti, M. Muhiban, A. Muhtarom, U.M. Rahmat, Y. Santosa & S. Aulagnier (2018).** Density and spatial partitioning of endangered sympatric Javan Leopard (Felidae) and Dholes (Canidae) in a tropical forest landscape. *Folia Zoologica* 67(3–4): 207–219. <https://doi.org/10.25225/fozo.v67.i3-4.a8.2018>
- Rahman, D.A., R. Herliansyah, P. Rianti, U.M. Rahmat, A.Y. Firdaus & M. Syamsudin (2019).** Ecology and conservation of the endangered Banteng (*Bos javanicus*) in Indonesian tropical lowland forest. *Hayati Journal of Biosciences* 26: 68–80. <https://doi.org/10.4308/hjb.26.2.68>
- Rahman, D.A. (2020).** Ecological niche and potential distribution of the endangered *Bos javanicus* in south-western Java, Indonesia. *Therya* 11(1): 57–68. <https://doi.org/10.12933/therya-20-840>
- Rahman, D.A. & A. Mardiasuti (2021).** Factors influencing the activity patterns of two deer species and their response to predators in two protected areas in Indonesia. *Therya* 12(1): 149–161. <https://doi.org/10.12933/therya-21-1087>
- Thinley, P., J.F. Kamler, S.W. Wang, K. Lham, U. Stenkewicz & D.W. Macdonald (2011).** Seasonal diet of Dholes (*Cuon alpinus*) in northwestern Bhutan. *Mammalian Biology* 76: 518–520. <https://doi.org/10.1016/j.mambio.2011.02.003>
- Venkataraman, A.B., R. Arumugam & R. Sukumar (1995).** The foraging ecology of Dholes (*Cuon alpinus*) in Mudumalai sanctuary, southern India. *Journal of Zoology* 237(4): 543–561. <https://doi.org/10.1111/j.1469-7998.1995.tb05014.x>
- Wang, S.W. & D.W. Macdonald (2009).** Feeding habits and niche partitioning in a predator guild composed of tigers, leopards and Dholes in a temperate ecosystem in central Bhutan. *Journal of Zoology* 277(4): 275–283. <https://doi.org/10.1111/j.1469-7998.2008.00537.x>



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