

and coloration also appear unusual. In the Inner Gulf of Thailand, Heuglin's Gull is a regular visitor in small numbers of up to 20 birds (Round *et al.* 2009), and there are also a few records of Slaty-backed Gull *L. schistisagus*, Mongolian Gull and Lesser Black-backed Gull (N. Upton and P. Round pers. comm.) The nearest records of Heuglin's Gull *sensu stricto* are from Peninsular Malaysia (Anon. 2006), where it has also been recorded as a vagrant, and there is an unconfirmed record from Singapore of a Herring-type gull which may have been Heuglin's (Wells 1999). The nominate form of the rather similar (but darker-mantled) Lesser Black-backed Gull has been recorded as far south-east as the Cocos (Keeling) Islands (Olsen & Larsson 2003).

**Description:** A large gull of c.60 cm body length. Head white and unstreaked. Upperparts overall dark in appearance; primaries dark brown, and primary coverts and alula showing substantial white; scapulars, mantle, lesser coverts, median coverts and greater coverts dark grey. Underparts white (and unstreaked) on neck, chest, belly and vent. Tail all white above when viewed in flight. Legs light yellow; bill shortish, stout, extensive yellow on distal upper mandible and dark red and black on gonys, with a pale base. Difficult to judge primary moult score but an old primary five (p5) feather present.

The following possible confusion species in third-year plumage can be excluded: Slaty-backed Gull, ruled out at any age owing to the yellowish tone to the legs of the Wetar bird; Vega Gull *L. vegae*, which in its third year would show brown streaking on the head and nape; Mongolian Gull, which in its third winter shows paler grey rather than dark grey wings; and Caspian Gull *L. cachinnans* and Lesser Black-backed Gull, which would show a substantially darker mantle.

### Acknowledgements

The Wetar survey was supported financially by Birdfair/Royal Society for the Protection of Birds Research Fund for Endangered Birds, Sophie Danforth Conservation Biology Fund and the Oregon Zoo Foundation's Future for Wildlife Conservation Fund. Research visas and permits were obtained through Kementerian Riset dan Teknologi (RISTEK), with the support of the Wildlife Conservation Society and Dewi Prawiradilaga of the Indonesian Institute of Sciences (LIPI). David Bakewell and Nial Moores reviewed the article and provided important clarifications on the identification of the gull, and criticisms, which improved the article. Thanks to Ruud Altenburg (Gull Research Organisation), Nick Brickle (Wildlife Conservation Society), Klaas van Dijk, James Eaton (Birdtour Asia) and Theo Musse for taking time to view the photographs and comment on the identity of the gull. Nina Cheung, David Bakewell and David Li provided details of the Malaysian sighting; Yong Ding Li and Alfred Chia provided information on the Singapore record; Nick Upton and Philip Round provided a summary of Herring Gulls from Thailand and Marc Gardner provided details of his Silver Gull *Chroicocephalus novaehollandiae* observation on Bali.

### References

Anonymous (2006) New gull species in Malaysia? Heuglin's Gull *Larus heuglini*. *Suara Enggang* 14(1): 26.

BirdLife International (2010) The BirdLife checklist of the birds of the world, with conservation status and taxonomic sources. Version 3. Downloaded from <http://www.birdlife.org/datazone/>

Brazil, M. (2009) *Birds of East Asia: China, Taiwan, Korea, Japan and Russia*. Oxford: Princeton University Press.

Bruce, M. D. (1987) Additions to the birds of Wallacea 1. Bird records from smaller islands in the Lesser Sundas. *Kukila* 3: 38–44.

Coates, B. J. & Bishop, K. D. (1997) *A guide to the birds of Wallacea*. Alderley, Queensland: Dove Publications.

Hartert, E. (1904) On the birds of the south-west Islands of Wetter, Roma, Kisser, Letti and Moa. *Novitates Zoologicae* 11: 174–221.

Inskipp, T., Lindsey, N. & Duckworth, W. A. (2001) *Checklist of the birds of the Oriental Region*. Oriental Bird Club. (Web address: [www.orientalbirdclub.org/publications/checklist/](http://www.orientalbirdclub.org/publications/checklist/))

Liebers, D., Helbig, A. J. & de Knijff, P. (2001) Genetic differentiation and phylogeography of gulls in the *Larus cachinnans–fuscus* group (Aves: Charadriiformes). *Molecular Ecology* 10: 2447–2462.

Olsen, K. M. & Larsson, H. (2003) *Gulls of Europe, Asia and North America*. London: Christopher Helm.

Round, P. D., Kongtong, W., Narungsri W. & Sutibut S. (2009) *Birds of Laem Phak Bia*. Bangkok: Laem Phak Bia Environmental Research and Development Project.

Sukmantoro, W., Irham, M., Novarino, W., Hasudungan, F., Kemp, N. & Muchtar, M. (2007) *Daftar Burung Indonesia No. 2*. Bogor: Indonesian Ornithologists' Union.

Trainor, C. R. (2005) Waterbirds and coastal seabirds of Timor-Leste (East Timor): status and distribution from surveys in August 2002–December 2004. *Forktail* 21: 61–78.

Trainor, C. R., Imanuddin, Firmann, A., Verbelen, P. & Walker, J. S. (2009) The birds of Wetar, Banda Sea: one of Indonesia's forgotten islands. *BirdingASIA* 12: 78–93.

Wells, D. R. (1999) *The birds of the Thai-Malay Peninsula*, 1. Non-passerines. London: Academic Press.

White, C. M. N. (1975) Migration of Palaearctic waders in Wallacea. *Emu* 75: 35–39.

White, C. M. N. & Bruce, M. D. (1986) *The birds of Wallacea (Sulawesi, the Moluccas & Lesser Sunda Islands Indonesia): an annotated check-list*. London: British Ornithologists' Union (Check-list No 7).

**Colin R. TRAINOR**, School of Environmental and Life Sciences, Charles Darwin University 0909, Northern Territory, Australia. Email: [colin.trainor@cdu.edu.au](mailto:colin.trainor@cdu.edu.au)

**IMANUDDIN**, Faculty of Forestry, Department of Natural Resources, Conservation and Ecotourism, Bogor Agricultural University (IPB), Bogor, Indonesia. Email: [imutoro@yahoo.com](mailto:imutoro@yahoo.com)

**Jonathon S. WALKER**, Columbidae Conservation, Unit 1 (OpenSpace), Old Birley Street, Manchester, M15 5RF, UK. Email: [jon@columbidae.org.uk](mailto:jon@columbidae.org.uk)

## Status of vultures in Mudumalai Tiger Reserve, Western Ghats, India

THARMALINGAM RAMESH, KALYANASUNDARAM SANKAR & QAMAR QURESHI

India harbours nine species of vultures, and of these White-backed Vulture *Gyps bengalensis*, Indian Vulture *G. indicus* and Red-headed Vulture *Sarcogyps calvus* are classified by IUCN as Critically Endangered (BirdLife International 2008). Their sudden decline in the Indian subcontinent in the last decade was attributed to disease, poisoning and reduction in food availability, although diclofenac poisoning is now widely regarded as the principal cause in India (Prakash *et al.* 2003, Green *et al.* 2004, 2007, Shultz *et al.* 2004, Swan *et al.* 2006). Apart from their own threatened status, vultures are

ecologically important in human-dominated areas, as scavengers at primitive slaughterhouses and carcass dumps (Satheesan 1989, Mundy *et al.* 1992), and in natural areas, as scavengers on animal carcasses of large mammals killed by carnivores (Houston 1974, Hunter *et al.* 2007, Majumder *et al.* 2009). As most of the studies on vultures have been restricted to the northern, western, eastern and central states of India (Prakash *et al.* 2003), baseline studies are needed in southern India to understand the status and dynamics of the populations there.

We recorded opportunistic sightings of vultures in Mudumalai Tiger Reserve from 1 March 2006 to 30 April 2010, as part of a study on large carnivores. Mudumalai Tiger Reserve (11°32'–11°43'N 76°22'–76°45'E) is situated in the Western Ghats of India. This 321 km<sup>2</sup> reserve is bounded by Wayanad Wildlife Sanctuary on the west, Bandipur Tiger Reserve in the north and Nilgiri North Forest Division in the south. The sampling covered all the forest beats of the reserve. According to Champion & Seth (1968), the vegetation types in Mudumalai are classified into Southern Tropical Dry Thorn Forest, Southern Tropical Dry Deciduous Forest, Southern Tropical Moist Deciduous Forest, Southern Tropical Semi Evergreen forest, Moist Bamboo Brakes and Riparian Forest.

While conducting sign surveys for carnivores, walking line transects or driving vehicle transects in order to estimate ungulate densities, we noted any sighting of a vulture, the number of individuals of each species and the major vegetation type within 50 m radius. Efforts were also made to locate vultures around villages near livestock carcass dumps. Observations were made all year, with the exception of the July–August monsoon in 2006 and 2007. In total, 29 independent observations of vultures were made during the study in 1,493 hours of observation.

Among the three species of vultures, White-rumped Vulture (WRV) was sighted the most (n=242), followed by Red-headed Vulture (RHV) (n=48) and Indian Vulture (IV) (n=15). Most of the vulture sightings were recorded in open scrub (35%) followed by dry deciduous (25%), moist deciduous (17.5%), riverine (17.5%) and interspersed patches of swampy ricefield in the semi-evergreen habitat (5%).

Multiple species groups of WRV–IV (n=1), WRV–RHV (n=8) and WRV–IV–RHV (n=2) were seen feeding on large carnivore kills. Overall vultures were observed feeding on 20 chital *Axis axis*, six gaur *Bos gaurus* and two sambar *Rusa unicolor* carcasses of large carnivore kills. The maximum number of individuals observed in each sighting was 40 WRV, 12 IV and 5 RHV.

Our observations of nests were all on the top of live trees along Sigur River at Chemmanatham. Two nests of WRV, built on *Terminalia arjuna*, had three nestlings each, and two nests of LRV, built on *Dalbergia lanceolaria*, had two nestlings. The observations with three nestlings are unusual, as *Gyps* vultures usually have only one or two (Grossman & Hamlet 1964). Nesting in trees is also unusual for the species: IV nests have been reported rarely on trees in India (Majumder *et al.* 2009). On 15 April 2006, five unoccupied nests of WRV were also seen along with its active nests in the same area. Subsequently 12 nests (nine active and three unoccupied) of WRV and RHV (two active nests) were seen in the same location and a nearby area on 1 January 2010, although at that time we were unable to check the number of nestlings.

During the present study vultures were sighted only on kills of large mammalian predators. Although vulture nesting sites were observed 2 km from Masinagudi village, where livestock carcasses are dumped, no vultures were sighted on such carcasses during the study. Hence, while acknowledging that less sampling effort was made in human-dominated areas, we believe that the vultures of Mudumalai are dependent on large carnivore kills. Similar observations have been made by Majumder *et al.* (2009) on vultures feeding on predator kills in Pench Tiger Reserve, Madhya Pradesh. Houston (1974) and Hunter *et al.* (2007) reported that vultures in Africa were also dependent on large carnivore kills for survival. Feeding on a single carcass by two or three species of vultures together, as recorded during the study, has also been reported in other parts of India (Ali & Ripley 1968–1998, Majumder *et al.* 2009).

Use of diclofenac in the villages around the park should be monitored as it has caused large-scale mortality in vultures in different parts of the country and could well be a cause of the low number of vultures sighted in the park. We hope this baseline study

will encourage long-term monitoring of vulture populations in southern India, and further research on breeding habits and resource availability for the species in the region.

## Acknowledgements

We thank the Director, Wildlife Institute of India, and the Tamil Nadu Forest Department for giving permission to work in Mudumalai Tiger Reserve. Special thanks to Riddhika for her comments on the draft manuscript. We are indebted to our field assistants M. Kunmari, C. James, M. Kethan, S. Mathan and T.M. Manpan for their extensive help in the field.

## References

- Ali, S. & Ripley, S. D. (1968–1998) *Compact handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. Bombay: Oxford University Press.
- Birdlife International (2008) *Threatened birds of Asia: the BirdLife International Red Data Book*. Cambridge, UK: BirdLife International.
- Champion, H. G. & Seth, S. K. (1968) *A revised survey of the forest types of India*. New Delhi: Government of India Publication.
- Green, R. E., Newton, I., Shulz, S., Cunningham, A. A., Gilbert, M., Pain D. J. & Prakash. V. (2004) Diclofenac poisoning as a cause of vulture population declines across the Indian subcontinent. *J. Appl. Ecol.* 41: 793–800.
- Green, R. E., Taggart, M. A., Senacha, K. R., Raghavan, B., Pain, D. J., Jhala, Y. & Cuthbert, R. (2007) Rate of decline of the Oriental White-backed Vulture population in India estimated from a survey of diclofenac residues in carcasses of ungulates. *PLoS ONE* 8: 1–10.
- Grossman, M. L. & Hamlet, J. (1964) *Birds of prey of the world*. New York: Bonanza Books.
- Houston, D. C. (1974) The role of griffon vultures *Gyps africanus* and *Gyps ruppellii* as scavengers. *J. Zool.* 172: 35–46.
- Hunter, J. S., Durant, S. M. & Caro, T. M. (2007) Patterns of scavenger arrival at cheetah kills in Serengeti National Park Tanzania. *Afr. J. Ecol.* 45: 275–281.
- Majumder, A., Basu, S., Sankar K. & Qureshi, Q. (2009) Some observations on vultures in Pench Tiger Reserve, Madhya Pradesh. *J. Threatened Taxa* 1: 627–628.
- Mundy, P., Butchart, D., Ledger J. & Piper, S. (1992) *The vultures of Africa*. Randburg, South Africa: Acorn Books.
- Prakash, V., Pain, D. J., Cunningham, A. A., Donald, P. F., Prakash, N., Verma, A., Gargi, R., Sivakumar, S. & Rahmani, A. R. (2003) Catastrophic collapse of Indian White-backed *Gyps bengalensis* and Long-billed *Gyps indicus* Vulture populations. *Biol. Conserv.* 109: 381–390.
- Satheesan, S. M. (1989) Birds at vulture feeding sites in Agra. *Vulture News* 21: 25.
- Shultz, S., Baral, H. S., Charman, S., Cunningham, A. A., Das, D., Ghalsasi, G. R., Goudar, M. S., Green, R. E., Jones, A., Nighot, P., Pain, D. J. & Prakash, V. (2004) Diclofenac poisoning is widespread in declining vulture populations across the Indian subcontinent. *Proc. R. Soc. Lond. B* 271 (suppl. 6): S458–S460.
- Swan, G. E., Cuthbert, R., Quevedo, M., Green, R. E., Pain, D. J., Bartels, P., Cunningham, A. A., Duncan, N., Meharg, A. A., Oaks, J. L., Parry-Jones, J., Shultz, S., Taggart, M. A., Verdoorn, G. & Wolter, K. (2006) Toxicity of diclofenac to *Gyps* vultures. *Biol. Lett.* 2: 279–282.

**Tharmalingam RAMESH**, Habitat Ecology, Wildlife Institute of India, P.O Box # 18, Chandrabani, Dehradun-248001, Uttarakhand, India. E-mail: ramesh81ngl@gmail.com

**Kalyanasundaram SANKAR**, Habitat Ecology, Wildlife Institute of India, PO Box # 18, Chandrabani, Dehradun-248001, Uttarakhand, India

**Qamar QURESHI**, Landscape Ecology, Wildlife Institute of India, P.O Box # 18, Chandrabani, Dehradun-248001, Uttarakhand, India