New localities and sexual dichromatism in Blue-green eyed Spotted Cuscus

*Spilocuscus wilsoni* Helgen et Flannery, 2004 (Mammalia: Marsupialia: Phalangeridae) from Biak Island, Indonesia

Aksamina Maria Yohanita 1, Kanthi Arum Widayati 2, Tri Atmowidi 3, Hiroo Imai 4 & Bambang Suryobroto 5

1-3,5 Department of Biology, IPB University, Kampus IPB Dramaga, Bogor, Indonesia.

4 Molecular Biology Section, Center for the Evolutionary Origins of Human Behavior (eHUB), Kyoto University, Inuyama, Aichi 484-8506, Japan.

5 suryobroto@apps.ipb.ac.id

Abstract: Spotted cuscuses are medium-sized tree-dwelling mammals native to tropical forests of Australo-Papua that primarily feed on fruits and leaves. They belong to the phalangerid genus *Spilocuscus* (Gray, 1862). The difference in pelage color between male and female *Spilocuscus wilsoni* has not yet been well described morphologically. In the present study, we describe the coat color of four *S. wilsoni* individuals: a male adult, a sub-adult male, a sub-adult female, and a juvenile female. Dorsal, lateral, and ventral body section images were captured on camera, and body weight & length, tail & ear length were measured. The adult male *S. wilsoni* had brown spot and blotch patterns on the dorsal and lateral regions, and the ventral region was plain beige. The sub-adult male had distinct spot patterns without blotches on the dorsal and lateral regions, while the ventral region was plain with a cream base color. The sub-adult female had a mottled pattern that blended with the base color, making a silvery appearance. The female juvenile was spotless throughout, with a foundation hue ranging from creamy to somewhat yellow.

Keywords: Biak Island Spotted Cuscus, coat color, medium-sized tree-dwelling mammal, morphologically describe.
INTRODUCTION

Spotted cuscuses are medium-sized tree-dwelling marsupials that primarily feed on fruits and leaves and are native to tropical forests of Australo-Papua. They belong to the phalangerid genus *Spilocuscus* (Gray, 1862). Previously, Biak Island’s Spotted Cuscus was considered belonging to the group *S. maculatus* (Flannery 1995b), but later it was separated as a new species *Spilocuscus wilsoni* Helgen et Flannery, 2004. Among all the species of Spilocuscus, this is the only one that possesses blue-green eyes. *S. wilsoni* is one of the smaller species from genus *Spilocuscus* that coexist with *S. maculatus* on Biak Island.

*S. wilsoni* is found exclusively on the oceanic islands of Biak-Supiori, located in the northern region of New Guinea. Biak-Supiori Island has an area of 2,497 km², located off the coast of Sahul, which has no connection with mainland New Guinea. The endemicity and restricted range of *S. wilsoni* make it ‘Critically Endangered’ on the IUCN Red List (Aplin & Helgen 2016). The description of *S. wilsoni* was based on two samples; a juvenile male (holotype) and an adult male (paratype) from the Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands (RMNH) (now Naturalis) (Helgen & Flannery 2004). Furthermore, an immature individual of unspecified sex, residing as a domesticated animal within a family setting on Biak, was captured in photograph by Flannery 1992, and constitutes an additional paratype (Helgen & Flannery 2004).

The description of *S. wilsoni* is based on craniodental characters and coat color diagnosis of an adult male (paratype) on dry skin. The adult paratype has a pure white coat dorsally and ventrally, shared only with *S.m. maculatus* of northern New Guinea (Helgen & Flannery 2004). The immature holotype is known to be male, however, there is no information about coat color and body size (Helgen & Flannery 2004).

The pelage color description is essential in the identification of species and individuals. Although the identification of species involved adult individuals, immature individuals also need to be known because the pelage colors of mammals are not necessarily fixed throughout their lifetimes (Caro & Mallarino 2020). Baby marsupials, including cuscus, have pink skin and very little hair, and most weigh less than 0.01% of the mother’s weight at birth (Hughes & Hall 1988). The difference in pelage color between male and female *S. wilsoni* has not yet been well described morphologically. We found that sub-adult *S. wilsoni* show sexual dicromatism (mottled in females versus spotted and pale color in males), a limited phenomenon among mammals (Caro 2009) but not unusual among cuscuses (Flannery 1995a,b; Caro 2013).

In this study, we describe the coat color pattern of an adult male, sub-adult male, sub-adult female, and juvenile female of *S. wilsoni*. We also measured the body and marked the location where *S. wilsoni* was found for this distribution data.

MATERIAL AND METHODS

This study was conducted from July 2021 to October 2021. Four individuals of *S. wilsoni* from Biak represented the age categories of adult male, sub-adult male, sub-adult female, and juvenile female, one individual, respectively. Information on the origin of the cuscus habitat was obtained directly from a local resident for 1, 2, and 3 and from a keeper in the Biak Bird and Orchid Park for 4 (Figure 1). The subjects were recorded using Canon EOS 750D digital camera with Canon lens EF-S 18–55 mm/F3.5–5.6 (Canon, Tokyo, Japan) in the RAW format. Photographs of the dorsal, lateral, and ventral areas are made in the same frame with a color checker passport. *S. wilsoni* body measurements include weight (W), head-body length (HBL), tail length (TL), and ear length (EL). All length measurements are in centimeters and weight measurements are in grams. This study has received approval from the IPB Animal Ethics Commission (Number 207-2021 IPB).

RESULTS

Adult male

The adult male appears to have a creamy base color and brown spotted and blotched morphs. The spotted and blotched morphs dominate the dorsum and flank, spreading from the head, back, limbs, and half of the tail. The blotch of the head is very dark, and the ears are covered with hair. The muzzle is hairless and darker in color compared to the chin area. The pelage on the foot is darker than the arms. Some ends of the hair strands look blackish and silvery in the dorsum and flank areas, while the ventral area does not. The ventral coat is creamy from the chin and belly to the limbs. This individual has blue-green eyes. The body measurements are as follows: W = 2,480 g; HBL = 46.5 cm; TL = 44 cm; and EL = 2.5 cm. This individual was found in the secondary forest around Warsa village, northern Biak (Image 1).
Figure 1. Original habitat of *Spilocuscus wilsoni*.

Sub-adult male
The sub-adult male appears to have a more dominant creamy base color, and the spotted morph is brown. Spotted morphs spread from the head, back, limbs, and half of the tail but is less than that of adults. The blotch area of the head is brown, the area from the cheeks to the chin is creamy, and the ears are covered with hair. The pelage on the foot is dark. The ventral coat is creamy and a little orange in the chest area. This individual has blue-green eyes. The body measurements are as follows: \( W = 1,300 \text{ g}; \) \( HBL = 36 \text{ cm}; \) \( TL = 35 \text{ cm}; \) and \( EL = 2 \text{ cm}. \) This individual was found in the secondary forest around Makmakerbo Village, eastern Biak (Image 2).

Sub-adult female
The whole body of this sub-adult female is a mixture of creamy, light brown, and dark brown colors. The hair of the head area is a mixture of light brown on the face and dark brown on the head. The ears are covered with brown hair. The hair on the dorsum and flank areas has a mottled pattern of creamy and dark brown, while the tail area is light brown. The ends of the hair strands on the dorsum and flank areas appear silvery-buff hairs. The pelage on the foot is darker than the arms. The creamy-colored ventral area looks like a coat from head to legs. The belly part has an unopened sac. This individual has blue-green eyes. The body measurements are as follows: \( W = 1,100 \text{ g}; \) \( HBL = 33 \text{ cm}; \) \( TL = 30.7 \text{ cm}; \) and \( EL = 1.5 \text{ cm}. \) This individual was found in the secondary forest around Swandiwe Village, western Biak (Image 3).

Juvenile female
The whole body of this juvenile female looks creamy and unspotted (dorsum, flank, and belly visible). The hair on the head is thinner than that on the body. The muzzle is hairless and pink, and the ears are covered with light yellow hair. The dorsum and flank parts, including the legs, are creamy and look a little yellow in the upper back. Some ends of the hair strand on the dorsum and flank areas appear blackish and silvery. The belly part has an unopened sac. This individual has yellow-green

![Image 2. Sub-adult male of Spilocuscus wilsoni. © Yohanita AM, 2021.](image-url)
New localities and sexual dichromatism in *Spilocuscus wilsoni* from Biak Island, Indonesia

Yohanita et al.


especially in females, and it is recorded that four spots (Table 1). The spotted cuscus has a unique color, for sexual dichromatism as females lack spots (Flannery 1995a; Helgen & Flannery 2004; Caro 2013), except for S. wilsoni showing differences in pelage color patterns between males and females. The female had a mottled pattern throughout the dorsal and lateral to ventral areas, while the ventral area was unspotted. We conclude that the sub-adult S. wilsoni shows sexual dichromatism (mottled in females versus spotted and pale color in males). Some cuscuses have spots or dorsal stripes; the spotted cuscuses S. maculatus and S. rufoniger show sexual dichromatism as females lack spots (Flannery 1995a; Helgen & Flannery 2004; Caro 2013), except for S. papuensis in which both males and females had spots (Table 1). The spotted cuscus has a unique color, especially in females, and it is recorded that four species inhabit the mainland and islands of Papua. The female S. maculatus in the northern islands is plain yellowish-white, while in mainland Papua it is yellowish-white with orange markings from mid-back to the abdomen. Furthermore, the S. rufoniger female displays black saddle markings that cover both the mid-back and hind limbs (Helgen 2007).

The sub-adult and adult males in this study showed a brown spotted pattern. Nevertheless, the spots on the sub-adult individual are smaller and more discrete, so the beige base is more dominant. In adults, a blotch on the head extends to the upper back to the forelimbs, and a blotch on the lower back area to the tail and hind limbs; therefore, the brown blotch is more dominant. S. wilsoni juvenile female has a plain cream coloration all over the body, and it seems that pale, plain colors are common among juveniles of Spilocuscus. The colors of mammal pelage may not remain constant over their entire lifespan (Caro & Mallarino 2020). Certain pigs and peccaries experience age-related transformation; for example, they are born with spotted and striped coats that eventually become consistent as they become mobile (Caro et al. 2018).

The immature S. wilsoni photographed by Flannery

### DISCUSSION

Our observation of the coat colors of four individual S. wilsoni showed differences in pelage color patterns between males and females. The female had a mottled pattern throughout the dorsal and lateral to ventral edges and appeared to be wearing a coat. The male had a spotted and blotched pattern on the dorsal and lateral areas, while the ventral area was unspotted. We conclude that the sub-adult S. wilsoni shows sexual dichromatism (mottled in females versus spotted and pale color in males). Some cuscuses have spots or dorsal stripes; the spotted cuscuses S. maculatus and S. rufoniger show sexual dichromatism as females lack spots (Flannery 1995a; Helgen & Flannery 2004; Caro 2013), except for S. papuensis in which both males and females had spots (Table 1). The spotted cuscus has a unique color, especially in females, and it is recorded that four species inhabit the mainland and islands of Papua. The female S. maculatus in the northern islands is plain yellowish-white, while in mainland Papua it is yellowish-white with orange markings from mid-back to the abdomen. Furthermore, the S. rufoniger female displays black saddle markings that cover both the mid-back and hind limbs (Helgen 2007).

The sub-adult and adult males in this study showed a brown spotted pattern. Nevertheless, the spots on the sub-adult individual are smaller and more discrete, so the beige base is more dominant. In adults, a blotch on the head extends to the upper back to the forelimbs, and a blotch on the lower back area to the tail and hind limbs; therefore, the brown blotch is more dominant. S. wilsoni juvenile female has a plain cream coloration all over the body, and it seems that pale, plain colors are common among juveniles of Spilocuscus. The colors of mammal pelage may not remain constant over their entire lifespan (Caro & Mallarino 2020). Certain pigs and peccaries experience age-related transformation; for example, they are born with spotted and striped coats that eventually become consistent as they become mobile (Caro et al. 2018).

The immature S. wilsoni photographed by Flannery

### Table 1. Differences in pelage coloration and iris color in Spilocuscus wilsoni compared to other Spilocuscus.

<table>
<thead>
<tr>
<th>Species</th>
<th>Pelage color</th>
<th>Iris color</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. wilsoni</td>
<td>Adult males unspotted are yellowish white (Helgen 2007).</td>
<td>Blue-green (Helgen &amp; Flannery 2004).</td>
</tr>
<tr>
<td></td>
<td>Sub-adult has a more dominant creamy base color, and the spotted morph is brown.</td>
<td>Yellow-green (juvenile) and blue-green (sub-adult and adult).</td>
</tr>
<tr>
<td></td>
<td>Adult females are red-spotted (ZMB 91706) (Helgen 2007).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The juvenile is creamy and unspotted in the entire body (dorsum, flank, and belly visible).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sub-adults have a mottled pattern that looks like a mixture of creamy, light brown, and dark brown colors (present study).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Pelage color</th>
<th>Iris color</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. papuensis</td>
<td>The complete lower surface and base color of the dorsum are creamy in appearance, while the spots covering the back, head, and limbs are dark brown or blackish. Frequently, the upper surface of the body is washed with a yellowish hue and commonly exhibits lighter patches of yellow and brownish speckles, while the tail is typically characterized by gold or red-brown spotting. The markings are more prominent and blotchy in males (Helgen 2007).</td>
<td>Carmine-red (Jentink 1885); as either brown or hazel (Flannery 1994, 1995b; Gray, 1862).</td>
</tr>
<tr>
<td></td>
<td>The female has the same basic coloration and spot pattern all over the body as the male. However, the spots are smaller and more discrete (Helgen 2007).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mature females exhibit colors ranging from yellowish-white to orange, and some may have yellowish-white coats with orange markings (Helgen 2007).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Pelage color</th>
<th>Iris color</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. maculatus from northern and western New Guinea</td>
<td>Mature males typically have a yellowish-white or orange hue, often featuring substantial orange and white spots or blotches on their mid-back (Helgen 2007).</td>
<td>Brown to hazel (Flannery, 1994, 1995a, 1995b; Gray, 1862).</td>
</tr>
<tr>
<td></td>
<td>Mature females show sexual dichromatism (present study).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The female displays a coloration identical to that of the male, with the exception of the absence of black spots on the back. Instead, they have a black saddle marking that extends over the mid-back and hind limbs (Helgen 2007).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Pelage color</th>
<th>Iris color</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. rufoniger</td>
<td>The dorsum of the animal has a creamy base-color with a superimposed pattern of intensely blackish (ranging from jet-black to maroon) spots or blotches on the mid-back and hind legs. The face, head, nape, shoulders, hands, feet, and sometimes the body of the limbs are covered in a vibrant red-orange or golden fur. The tail can be either golden or whitish, and the underside of the throat and chin is typically white fur that often extends as a crescent shape to the cheeks and ears, creating a striking contrast with the intense color of the head (Helgen 2007).</td>
<td>Brown to hazel (Flannery 1994, 1995a, 1995b; Gray, 1862).</td>
</tr>
<tr>
<td></td>
<td>The female displays a coloration identical to that of the male, with the exception of the absence of black spots on the back. Instead, they have a black saddle marking that extends over the mid-back and hind limbs (Helgen 2007).</td>
<td></td>
</tr>
</tbody>
</table>
in 1992 was of unknown sex and was used as additional paratype information (Helgen & Flannery 2004). We saw similar color patterns between the photo and *S. wilsoni* in this study (Image 3), and we conclude that its morphology belongs to the sub-adult female individual. We also found differences in the iris color of juvenile (yellow-green) and sub-adult or adult individuals (blue-green), but this needs further investigation.

**REFERENCES**


NAAS rating (India) 5.64

Birds
Dr. Hem Sagar Baral, Charles Sturt University, NSW Australia
Dr. Biju, Coimbatore, Tamil Nadu India
Dr. Chris Bowden, Royal Society for the Protection of Birds, Sandy, UK
Dr. Priya Davidar, Pondicherry University, Kalapet, Puducherry, India
Dr. J.W. Dudworth, IUCN SSC, UK
Dr. Rajay Japayal, SACON, Coimbatore, Tamil Nadu, India
Dr. Raj S. Kali, M.L.N College, Yamuna Nagar, Haryana, India
Dr. V. Santharam, Rishi Valley Education Centre, Chittoor Dt., Andhra Pradesh, India
Dr. S. Balachandran, Bombay Natural History Society, Mumbai, India
Dr. J. Praween, Bengaluru, India
Dr. C. Srinivasulu, Osmania University, Hyderabad, India
Dr. K.S. Gopi Sundar, International Crane Foundation, Baraboo, USA
Dr. Gombobata Sundar, Professor of Ornithology, Ulsanbaatar, Mongolia
Prof. Reuven Yosef, International Birding & Research Centre, Eilat, Israel
Dr. Tajuddin Munkur, Wetlands International, Wageningen, The Netherlands
Dr. Carol Inskip, Bishop Auckland Co., Durham, UK
Dr. Tim Inskip, Bishop Auckland Co., Durham, UK
Dr. V. Gokula, National College, Tiruchirapallli, Tamil Nadu, India
Dr. Arlandi Lelji, Russian Academy of Sciences, Vladivostok, Russia
Dr. Simon Dowell, Science Director, Chester Zoo, UK
Dr. Mário Gabriel Santiago dos Santos, Universidade de Trás-os-Montes e Alto Douro, Quinta de Pedras, Vila Real, Portugal
Dr. Grant Connette, Smithsonian Institution, Royal, VA, USA
Dr. P.A. Azeem, Coimbatore, Tamil Nadu, India

Mammals
Dr. Giovanni Amon, CNR - Institute of Systematic Studies, Rome, Italy
Dr. Anwaruddin Chowdhury, RMU, Guwahati, Assam, India
Dr. David Mallon, Zoological Society of London, UK
Dr. Shomita Mukherjee, SACON, Coimbatore, Tamil Nadu, India
Dr. Annie Aopil, Wildlife Institute of India, Dehradun, Dehradun
Dr. P.D. NAMEER, Kerala Agricultural University, Thrissur, Kerala, India
Dr. Ian Remond, UNEP Convention on Migratory Species, Lansdown, UK
Dr. Heidi S. Riddle, Riddle's Elephant and Wildlife Sanctuary, Arkansas, USA
Dr. Karin Schwartz, George Mason University, Fairfax, Virginia, USA
Dr. Lala A.K. Singh, Bhurbanwes, Orissa, India
Dr. Mewa Singh, Mysores University, Mysores, India
Dr. Paul Racey, University of Exeter, Devon, UK
Dr. Honnavalli N. Kumara, SACON, Anakkandy P.O., Coimbatore, Tamil Nadu, India
Dr. Nisith Dhariai, HNG University, Patan, Gujarat, India
Dr. Jagbir Singh, Sisiti Orohano Societa Italiana per la Storia della Fauna "Giuseppe Altobello", Rome, Italy
Dr. Justus Joshua, Green Future Foundation, Tiruchirapalli, Tamil Nadu, India
Dr. H. Raghuram, The American College, Madurai, Tamil Nadu, India
Dr. Paul Bates, Harison Institute, Kent, UK
Dr. Jim Sanderson, Small Wild Cat Conservation Foundation, Hartford, USA
Dr. Dan Challenger, University of Kent, Canterbury, UK
Dr. David Mallon, Manchester Metropolitan University, Derbyshire, UK
Dr. Brian L. Cypher, California State University-Stanislaus, Bakersfield, CA
Dr. S.S. Talmaae, Zoological Survey of India, Pune, Maharashtra, India
Dr. Sanjeev Chauhan, Sunder Nursery, New Delhi, India
Dr. Amritpal Singh, The Kingfisher Foundation, New Delhi, India
Dr. P. A. Azeeem, Coimbatore, Tamil Nadu, India

Reptiles
Dr. Gernot Vogel, Heidelberg, Germany
Dr. Rajeeve K. B.K., Achipah University, Pune, Maharashtra, India
Dr. Jack Tordoff, Critical Ecosystem Partnership Fund, Arlington, USA (Communities)
Dr. Ulrike Streicher, University of Oregon, Eugene, USA (Veterinary)
Dr. Dave L. Streicher, Eastman Foundation, Idaho, USA (Mammals)
Dr. Rajeev K. B.K., Achipah University, Pune, Maharashtra, India (Molecualr)
Dr. Nishith Dharaiya, HNG University, Patan, Gujarat, India
Dr. L. Praveen, Bengaluru, India
Dr. B. Singh, Wildlife Institute of India, Dehradun, Dehradun, India
Dr. S. Balachandran, Bombay Natural History Society, Mumbai, India

Amphibians
Dr. Sushil K. Dutta, Indian Institute of Science, Bengaluru, Karnataka, India
Dr. Annamalai, University of Natural History, Paris, France

Reptiles
Dr. Gernot Vogel, Heidelberg, Germany
Dr. Rajeeve K. B.K., Achipah University, Pune, Maharashtra, India
Dr. Jack Tordoff, Critical Ecosystem Partnership Fund, Arlington, USA (Communities)
Dr. Ulrike Streicher, University of Oregon, Eugene, USA (Veterinary)
Dr. Dave L. Streicher, Eastman Foundation, Idaho, USA (Molecualr)
Dr. Nishith Dharaiya, HNG University, Patan, Gujarat, India
Dr. L. Praveen, Bengaluru, India
Dr. B. Singh, Wildlife Institute of India, Dehradun, Dehradun, India
Dr. S. Balachandran, Bombay Natural History Society, Mumbai, India

Other Disciplines
Dr. Aniruddha Balsare, Columbia MO 65203, USA (Veterinary)
Dr. Mander S. Paingankar, University of Pune, Pune, Maharashtra, India (Molecular)
Dr. Jack Tordoff, Critical Ecosystem Partnership Fund, Arlington, USA (Communities)
Dr. Ulrike Streicher, University of Oregon, Eugene, USA (Veterinary)
Dr. Hari Balasubramaniam, EcoAdvisors, Nova Scotia, Canada (Communities)
Dr. Rajaeelel Santoso Rezaa, Universidade Federal de Sergipe, Brazil, (São, Brazil)
Dr. Jamie R. Wood, Landcare Research, Canterburry, New Zealand
Dr. Wendy Collinson-Jonker, Endangered Wildlife Trust, Gauteng, South Africa
Dr. Rajesh Kumar G. Jain, Andul Agricultural University, Andul, Gujarat, India
Dr. O.N. Tiwari, Senior Scientist, ICRJ-Indian Agricultural Research Institute (IARI), New Delhi, India
Dr. L.D. Singla, Guru Angad Dev Veterinary and Animal Sciences University, Anand, India

Reviewers 2020–2022
Due to paucity of space, the list of reviewers for 2018-2020 is available online. The opinions expressed by the authors do not reflect the views of the Journal of Threatened Taxa, Wildlife Information Liaison Development Society, Zoo Outreach Organization, or any of the partners. The journal, the publisher, the host, and the partners are not responsible for the accuracy of the political boundaries shown in the maps by the authors.
The Journal of Threatened Taxa (JoTT) is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under Creative Commons Attribution 4.0 International License unless otherwise mentioned. JoTT allows unrestricted use, reproduction, and distribution of articles in any medium by providing adequate credit to the author(s) and the source of publication.

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

September 2023 | Vol. 15 | No. 9 | Pages: 23827–23930
Date of Publication: 26 September 2023 (Online & Print)
DOI: 10.11609/jott.2023.15.9.23837-23930

Article

Phylogenetic insights on the delineation of Mysore and Malabar subspecies of the Grey Slender Loris *Loris lydekkerianus* in southern India
– Vinay Teja, Shivakumara Manu, Honnavalli N. Kumara & Govindhaswamy Umapathy, Pp. 23827–23835

Communications

New localities and sexual dichromatism in Blue-green eyed Spotted Cuscus *Spilocuscus wilsoni* Helgen et Flannery, 2004 (Mammalia: Marsupialia: Phalangeridae) from Biak Island, Indonesia
– Aksamina Maria Yohanita, Kanthi Arum Widayati, Tri Atmowidi, Hiroo Imai & Bambang Suryobroto, Pp. 23836–23842

Nest construction and repairing habits of Baya Weaver *Ploceus philippinus* (Aves: Passeriformes: Ploceidae) in the agricultural landscape of Villupuram District, Tamil Nadu, India
– M. Pandian, Pp. 23843–23856

A checklist of the avifauna of Samanatham tank, Madurai, Tamil Nadu, India

Composition of avian communities in Ranjit Sagar Conservation Reserve, Punjab, India
– Onkar Singh Braich, Sunil Kumar Saini & Jagdeep Singh, Pp. 23870–23878

Faunistic overview of the freshwater zooplankton from the urban riverine habitats of Pune, India
– Avinash Isaac Vanjare, Yugandhar Satish Shinde & Sameer Mukund Padhye, Pp. 23879–23888

Utilization of a new restoration technique for the rehabilitation of a degraded mangrove ecosystem: a case study from Koggala Lagoon, Sri Lanka
– Mahanama Gamage Greshan Dhanushka, Maduwe Guruge Manoj Prasanna, Kariyawasam Marthinna Gamage Gehan Jayasuriya & Indupa Hasindi Vitanage, Pp. 23889–23897

Diversity of powdery mildew fungi from protected areas of Jizzak region, Uzbekistan - a checklist

Notes

A case report on chronic renal disease in a captive wild Leopard *Panthera pardus* (Mammalia: Carnivora)

The first photographic evidence of Ruddy Mongoose *Herpestes smithii* Gray, 1837 (Mammalia: Carnivora: Herpestidae) in Katerniaghat Wildlife Sanctuary, Uttar Pradesh, India

New locality record of the Asiatic Long-tailed Climbing Mouse *Vandeleuria oleracea* (Bennett, 1832) (Mammalia: Rodentia: Muridae) from Kohora River Basin, Assam, India

Kukumseri: a home to *Colchicum luteum* Baker (Colchicaceae), a rare and endangered medicinal herb
– Rajender Kumar Sharma, Pp. 23925–23927

First record of the Western Himalayan Yew *Taxus contorta* (Gymnosperms: Cupressales: Taxaceae) from Lumbini Province, Nepal
– Santa Bahadur Thing, Deepak Raj Prakash Janga Shahi & Shashi Shrestha, Pp. 23928–23930