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Biology and conservation status of herbivorous mammal species in the collection of Taman Margasatwa Ragunan, Jakarta

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Abstract
Wildlife plays a crucial role in maintaining ecosystem balance. Some species serve as indicators of environmental conditions, with changes in population or behavior signaling ecological shifts. Therefore, conservation and protection efforts for wildlife are essential. One such conservation area is the establishment of Taman Margasatwa Ragunan (TMR) in Jakarta, which houses a collection of animals from various regions of Indonesia. The aims of TMR function as a reservoir for rare and protected species, allowing them to be bred and conserved.
The lack of comprehensive information on species, characteristics, classification, morphology, reproduction, and ecology of all animals at TMR highlights the need for a systematic and continuous study. This research aims to provide clear, complete, and comprehensive information on TMR's wildlife collection. In 2023, reptile species were identified, followed by bird species identification in 2024. These efforts resulted in books providing detailed information on reptiles and birds at TMR, serving as valuable references for students, researchers, and the general public.
Continuing this research, in 2025, a study will be conducted to examine the characteristics, systematics, morphology, and ecology of herbivorous mammals at TMR.
The preliminary results of this study show that there are 20 species of herbivorous mammals in the TMR. Sixteen species belong to the order Artiodactyla, while one species each belongs to the orders Diprotodontia, Perissodactyla, Proboscidea and Rodentia. Currently, the general characteristics, systematics, morphology, reproduction, ecology, and conservation status are being compiled for each species.

Keywords: Wildlife conservation, herbivorous mammals, species identification

Introduction
Animals, both terrestrial and marine, are essential to ecosystems and biodiversity. They serve as predators, prey, pollinators, decomposers, oxygen producers, sources of organic fertilizer, and indicators of environmental health. Predators help regulate animal populations, while prey maintain predator balance. Pollinators such as bees and butterflies are crucial for plant reproduction, which directly impacts human food production [1].
Given their vital role in nature, conservation efforts are necessary to ensure their survival [2]. Conservation involves the responsible management of biodiversity, including flora, fauna, and their habitats, to sustain natural ecosystems. However, increasing threats due to human activities make wildlife conservation more urgent than ever.
Wildlife conservation is becoming increasingly important as threats to their existence in nature continue to rise due to human activities [3]. There are two main conservation approaches: in-situ (protecting species in their natural habitats) and ex-situ (preserving species outside their natural environments) [4]. An example of an ex-situ conservation site in Jakarta is Taman Margasatwa Ragunan (TMR), which houses various animal species from across Indonesia. TMR was established as a wildlife conservation site aimed at preventing species extinction.
One of TMR's key initiatives is enhancing management and care for animals, creating an optimal environment for breeding endangered species. In addition to preserving rare species, TMR facilitates research and education. Many of its animals hold protected status, allowing scientists to study their characteristics, ecology, and distribution, which supports broader conservation efforts [5].

Despite TMR's extensive animal collection, there is no comprehensive book documenting the herbivorous mammal species it houses. To address this gap, research is being conducted to compile detailed information on their characteristics, classification, morphology, ecology, and distribution

Materials and Methods

Object, Location, and Time of Research

The research object for the year 2025 is the herbivorous mammal species collection of TMR Jakarta. This study was conducted at Taman Margasatwa Ragunan, Jakarta, located at Jl. Harsono RM No.1, Ragunan, Ps. Minggu, South Jakarta, Special Capital Region of Jakarta. Data collection takes place in enclosures housing herbivorous mammal populations within TMR. The research will be conducted over seven months (April-October 2024), consisting of several stages, from determining the data collection site to compiling the research report and final research output.

Fig 1: Animal location map at TMR

Tools and Materials: The tools used in this research include a digital camera, writing instruments, a tally sheet or logbook, a mobile phone, and a laptop.

Research Procedures: In 2025, the research will focus on herbivorous mammal species in the TMR collection. The research stages include a preliminary survey, determination of observation points, field observations, data collection, data processing, and data analysis. The research procedure is explained in the following diagram of research stages.

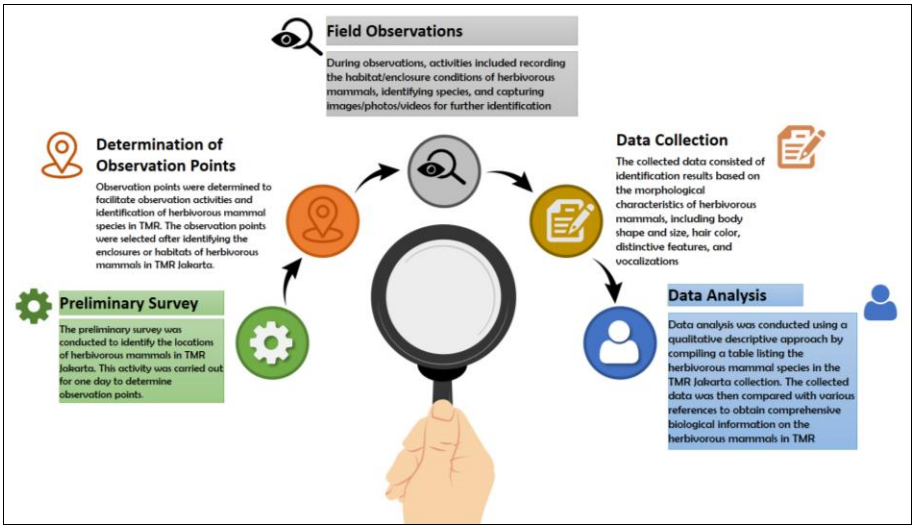

Fig 2: Research stages diagram

Results and Discussion

Orders and Species of Mammal Collections at TMR

Based on the identification conducted at all herbivorous mammal enclosures, a total of 20 species of herbivorous mammals are found in the TMR collection. The herbivorous mammal species at TMR include: pygmy hippopotamus, hippopotamus, Timor deer, Bawean deer, giraffe, sambar deer, oryx, sitatunga, barking deer, babirusa, anoa, nilgai, buffalo, banteng, one-humped camel, chital (spotted deer), wallaby kangaroo, zebra, Sumatran elephant, and capybara. The analysis of 20 species of herbivorous mammals in the TMR indicates that these species belong to five different orders, Artiodactyla, Diprotodontia, Perissodactyla, Proboscidea, and Rodentia (Table 1).

Table 1: Enclosure Locations and Species of Herbivorous Mammals in the TMR

No	Animal	Species name	Order	Status konservasi menurut IUCN	Enclosure Coordinates
1	Anoa Dataran	*Bubalus depressicornis*	Artiodactyla	Endangered (EN)	6.309426°S, 106.825009°E
2	Babi Rusa	*Babyrousa babyrussa*	Artiodactyla	Vulnerable (VU)	6.309938°S, 106.824490°E
3	Banteng	*Bos javanicus javanicus*	Artiodactyla	Critically Endangered (CR)	6.311347°S, 106.824792°E
4	Jerapah	*Giraffa camelopardalis*	Artiodactyla	Vulnerable (VU)	6.308694°S, 106.817509°E
5	Kerbau	*Bubalus bubalis*	Artiodactyla	Endangered (EN)	6.310663°S, 106.825641°E
6	Kijang Mas	*Muntiacus muntjak*	Artiodactyla	Least Concern (LC)	6.309296°S, 106.818401°E
7	Kuda Nil	*Hippopotamus amphibius*	Artiodactyla	Vulnerable (VU)	6.306191°S, 106.822772°E
8	Kuda Nil Kerdil	*Choeropsis liberiensis*	Artiodactyla	Endangered (EN)	6.305498°S, 106.822760°E
9	Nilgai	*Boselaphus tragocamelus*	Artiodactyla	Least Concern (LC)	6.309141°S, 106.825808°E
10	Onta Punuk Satu	*Camelus dromedarius*	Artiodactyla	Not Evaluated (NE)	6.311695°S, 106.824722°E
11	Oncis simbar	*Ovis ammon*	Artiodactyla	Endangered (EN)	6.309608°S, 106.813809°E
12	Rusa Bawean	*Axis kuhlii*	Artiodactyla	Critically Endangered (CR)	6.309816°S, 106.824943°E
13	Rusa Sambar	*Cervus unicolor equinus*	Artiodactyla	Vulnerable (VU)	6.308908°S, 106.825092°E
14	Rusa Timor	*Cervus timorensis russa*	Artiodactyla	Vulnerable (VU)	6.308944°S, 106.824927°E
15	Rusa Tutul	*Axis axis*	Artiodactyla	Least Concern (LC)	6.311448°S, 106.824328°E
16	Sitatunga	*Tragelaphus spekii*	Artiodactyla	Least Concern (LC)	6.309448°S, 106.825894°E
17	Kanguru Walabi	*Macropus agile*	Diprotodontia	Least Concern (LC)	6.310017°S, 106.818347°E
18	Zebra	*Equus quagga boehmi*	Perissodactyla	Near Threatened (NT)	6.309206°S, 106.825862°E
19	Gajah Sumatera	*Elephas maximus sumatranus*	Proboscidea	Critically Endangered (CR)	6.310019°S, 106.818497°E
20	Capibara	*Hydrochoerus hydrochaeris*	Rodentia	Least Concern (LC)	6.306215°S, 106.824350°E

The TMR collection contains 20 mammal species; the order with the highest number of species is Artiodactyla, comprising 80% (16 species). In contrast, the orders Diprotodontia, Perissodactyla, Proboscidea, and Rodentia are each represented by only one species (Figure 3).

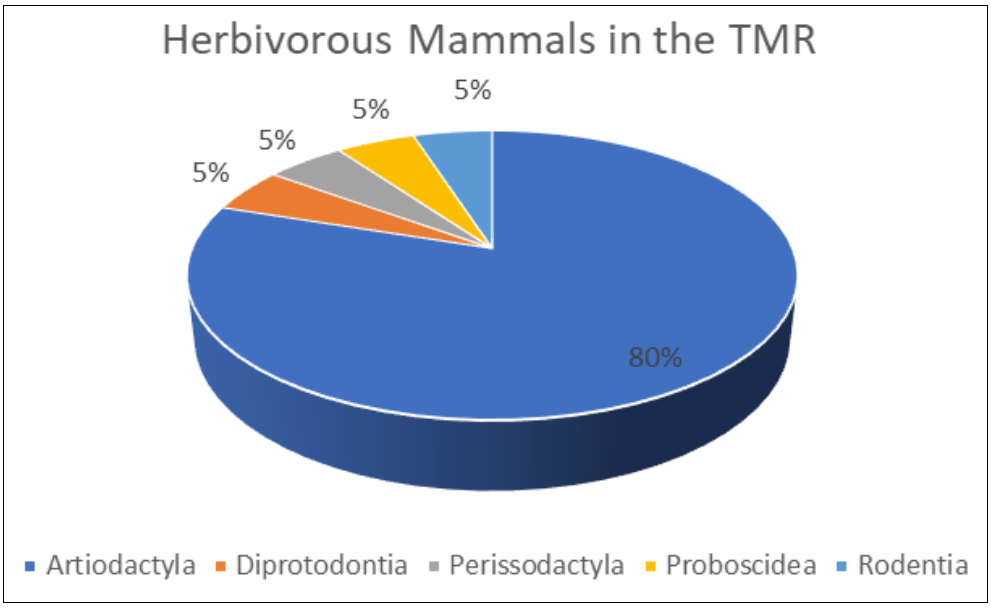

Fig 3: Percentage of species in each mammalian order at TMR

Order Artiodactyla

Artiodactyla is an order of even-toed ungulate mammals, characterized by an even number of toes (usually two or four), with the body weight evenly distributed across the central toes. This order encompasses a diverse range of herbivorous animals, widely distributed across various habitats, including grasslands, forests, and deserts [1].

Characteristics [2]

- **Even-toed hooves:** They have two or four main toes, with hooves often shaped like a cloven diamond (e.g., in cattle and deer).
- **Herbivorous diet:** Most members feed on plants, grasses, leaves, or fruits.
- **Complex digestive system:** Many species (such as cows

and goats) have a multi-chambered stomach (rumen) and practice rumination (chewing cud).
- **Robust body:** Generally large and strong-bodied animals, with legs adapted for fast movement or long-distance travel.
- **Wide habitat range:** Found in diverse ecosystems including savannas, mountains, tropical forests, and tundras.

Order Diprotodontia

Diprotodontia is the largest and most diverse order of marsupial mammals, with most of its members found in Australia and Oceania. A defining feature of this order is its unique dental structure and predominantly herbivorous diet [3].

Characteristics [4]

- **Diprotodont dentition:** Possesses two large lower incisors used for biting or grasping plant material-this trait gives the order its name.
- **Marsupialia:** Females have a pouch (marsupium) on their abdomen to carry and nurse their prematurely born young.
- **Large hind limbs:** Many species have strong hind legs, especially in hopping animals like kangaroos.
- **Syndactyly:** Some species exhibit fused second and third toes, which aid in grooming.
- **Herbivorous or omnivorous:** Most are plant-eaters, although some species have an omnivorous diet.

Order Perissodactyla

Perissodactyla is an order of odd-toed ungulate mammals. These animals are known for having an odd number of toes and a specialized foot structure where the middle toe primarily supports the body weight. They also possess digestive systems adapted for processing high-fiber plant material [5].

Characteristics [6]

- **Odd number of toes:** Typically possess one or three main toes. The body weight is supported mainly by the middle toe (third digit).
- **Herbivorous:** All members of this order are plant-eaters, primarily consuming grasses and leaves.
- **Large, high-crowned molars (hypsodont teeth):** Suited for grinding coarse, fibrous plant material.
- **Non-ruminant digestive system:** Fermentation of food occurs in the large intestine and cecum rather than in the stomach, as in ruminants.
- **Large and strong body:** Equipped with legs adapted for running fast or traveling long distances.

Order Proboscidea

Proboscidea is an order of large mammals best known through its only living members today - the elephants. The name *Proboscidea* comes from the Latin word *proboscis*, meaning "trunk," a distinctive, elongated structure formed from the nose and upper lip [7].

Characteristics [8]

- **Long trunk (proboscis):** Used for breathing, smelling, grasping food, drinking, and social interactions.
- **Elongated incisors forming tusks:** Found mainly in male elephants and some females; used for digging, stripping bark, and combat.
- **Large body size:** The largest land mammals in the world, weighing up to 5-6 tons.
- **Column-like legs:** Strong and straight, adapted to support their massive body weight.
- **Thick skin:** Can be several centimeters thick but remains sensitive.
- **Large ears (in some species):** Help regulate body temperature by dissipating heat.

Order Rodentia

Rodentia is the largest and most diverse order of mammals, comprising about 40% of all mammal species. Members of this order are commonly known as rodents and are found in almost every habitat around the world, except Antarctica [9].

Characteristics [10]

- **Continuously growing incisors:** They have a single pair of upper and lower incisors that never stop growing and must be worn down by gnawing on hard materials like wood or seeds.
- **Lack of canine teeth:** A gap (called a diastema) exists between the incisors and molars.
- **Varied body size:** Ranging from very small (e.g., mice) to large (e.g., capybaras).
- **Rapid reproduction:** Many species reproduce quickly and have short life cycles.
- **Wide range of habitats:** Rodents can live in forests, deserts, grasslands, mountains, and even human environments such as houses and cities.

Species Conservation Status (IUCN)

Based on the IUCN conservation status, 15% of the species are classified as Critically Endangered (CR), 20% as Endangered (EN), 20% as Vulnerable (VU), and 30% as Least Concern (LC). Meanwhile, species categorized as Near Threatened (NT) and those not assessed by the IUCN each represent 5% of the total (Figure 4).

These results indicate that 60% of the mammals in the TMR collection fall under protected categories according to the IUCN. The presence of protected species within conservation areas-both *in situ* and *ex situ*-may be attributed to several factors, including declining population trends in their natural habitats, difficulty in encountering individuals in the wild, and limited geographic distribution (endemism)[11].

The herbivorous mammal species in the TMR collection that are endemic to Indonesia include the lowland anoa, babirusa, Sumatran elephant, wallaby kangaroo, and Bawean deer. The anoa is found only in northern and central Sulawesi. The babirusa is native to Sulawesi, the Togian Islands, Sula Islands, and several islands in North Maluku. The Sumatran elephant occurs exclusively on Sumatra, while the wallaby kangaroo is endemic to Papua. The Bawean deer is restricted to Bawean Island, East Java.

As a major national zoological park, TMR maintains a collection of Indonesian species that are either endemic or under pressure. These species are often listed as protected because national regulations (and IUCN practice) generally assign protected status when one or more conditions are met, such as small population size, rapid population decline, extremely limited or endemic distribution, or a high risk of extinction. These reasons are supported by IUCN assessments and conservation literature, which highlight key drivers of

decline, including loss and fragmentation of natural habitats, hunting and wildlife trade, population pressure, and the loss of genetic diversity [12].

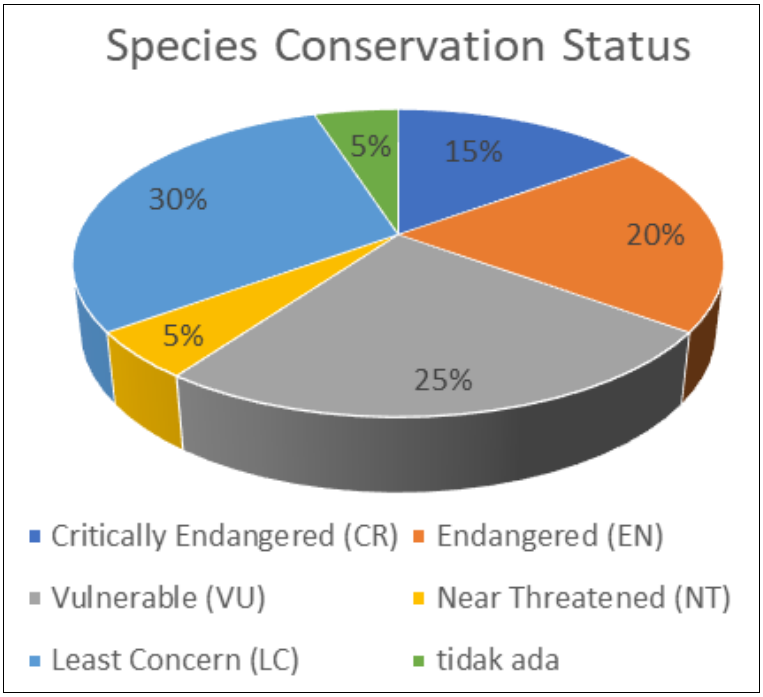

Fig 4: Conservation status of herbivorous mammals in the TMR collection according to the IUCN

There are three mammal species in the TMR collection classified as Critically Endangered (CR) by the IUCN: the banteng, the Bawean deer, and the Sumatran elephant. Species categorized as Endangered (EN) include the lowland anoa, water buffalo, pygmy hippopotamus, and scimitar oryx. Species classified as Vulnerable (VU) include the babirusa, giraffe, common hippopotamus, sambar deer, and Timor deer. The only species in the Near Threatened (NT) category is the zebra. One species in the collection, the dromedary camel, has no conservation status on the IUCN Red List because its population in the wild is abundant and it is a domesticated species that is easily bred.

Conclusion

Based on the findings of this study, it can be concluded that there are 20 species of herbivorous mammals in the TMR collection, originating from five orders: Artiodactyla, Diprotodontia, Perissodactyla, Proboscidea, and Rodentia. The order Artiodactyla constitutes 80% of the collection, while Diprotodontia, Perissodactyla, Proboscidea, and Rodentia each account for 5%. Of the 20 species of herbivorous mammals at TMR, five are Indonesian endemic species that are protected due to continuous population decline in their natural habitats: the anoa, babirusa, Sumatran elephant, agile wallaby, and Bawean deer.

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Conflict of Interest

The authors declare no conflict of interest regarding the publication of this manuscript. This research was conducted independently, with no commercial or financial relationships that could be construed as potential conflicts impacting the results or interpretations presented.

References

1. Alvarez-Castaneda ST. Mammals of North America - Volume 1. Systematics and Taxonomy. Springer. 2024. 57-86.
2. Mennecart B, Guignard C, Dziomber L, Shulz G, Muller B, Costeur L. Allometric and Phylogenetic Aspects of Stapes Morphology in Ruminantia (Mammalia, Artiodactyla). Front. Earth Sci. 2020;8:00176.
3. Myers P. Diprotodontia. Kangaroos, possums, wallabies, and relatives. Animal Diversity Web. https://animaldiversity.org/accounts/Diprotodontia/
4. Phillips MJ, Pratt RC. Family-level relationships among the Australasian marsupial “herbivores” (Diprotodontia: Koala, wombats, kangaroos, and possums). Molecular Phylogenetics and Evolution. 2008;46(2):594-605.
5. Huffman B. Order Perissodactyla. Odd-Toed Ungulates. https://www.ultimateungulate.com/Perissodactyla.html
6. Cope ED. The Perissodactyla. The American Naturalist. 1887;21(11):985-1007.
7. Deraniyagala PEP. Proboscidean. Britannica. https://www.britannica.com/animal/proboscidean
8. Sanders WJ, Gheerbrant E, Harris JM, Saegusa H, Delmer C. Proboscidea. Afrotheria. 2010;15:161-252.
9. Musser G. Rodent. Mammal. https://www.britannica.com/animal/rodent
10. Meyrs P. Rodentia. Scientific Classification. https://animaldiversity.org/accounts/Rodentia/
11. Wetlands International. Pentingnya Konservasi Satwa Liar: Sebuah Refleksi Hari Spesies Terancam Punah

2023. 2023. https://indonesia.wetlands.org/id/blog/pentingnya-konservasi-satwa-liar-sebuah-refleksi-hari-spesies-terancam-punah-2023/

12. Puspitasari A, Masyu'ud B, Sunarminto T. Nilai Kontribusi Kebun Binatang terhadap Konservasi Satwa, Sosial Ekonomi dan Lingkungan Fisik: Studi Kasus Kebun Binatang Bandung. Media Konservasi. 2016;21(2):116-124.