THE SCIENCE WORLD
A Monthly e Magazine
ISSN:2583-2212
Dec 2023 3(12) 4233-4240

Popular Article

# Pangolin Natural insect & termite controller: Causes and consequences of illegal trafficking

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https://doi.org/10.5281/zenodo.10432680

The Indian pangolin, also known as the Indian scaly anteater (*Manis crassicaudata*) is a species of pangolin native to the Indian subcontinent (Mahmood et al., 2019). Pangolins are unique mammals known for their protective scales and can consume up to 70 to 200 million insects annually hence they illustrate the crucial role in maintaining the balance of insect populations in their ecosystems. It's important to recognize the valuable ecological service that pangolins provide by helping to control insect pests, such as ants and termites, which can have a significant impact on agricultural and forest ecosystems. This makes pangolins important contributors to ecosystem health and highlights the importance of their conservation.

Physical Characteristics: Indian pangolins are characterized by their large, overlapping scales made of keratin, which provide protection from predators. When threatened, the pangolin can roll into a ball to protect its softer underbelly. Pangolins have strong, curved claws on their front and hind feet, which they use for digging into ant and termite nests and climbing trees. Their limbs are well-suited for their terrestrial and arboreal (tree-dwelling) habits. Underneath their scales, pangolins have sparse, bristly hair. The color of their hair and scales can vary among species, ranging from shades of brown to gray. Pangolin species vary in size, with the smallest species being around 30 centimeters (12 inches) long, while the largest can reach up to 1 meter (3.3 feet) in length. Pangolins have a keen sense of smell, which helps them locate ants and termites. They also have long, flexible ears that can close to protect against debris while digging.



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**Habitat:** Indian pangolins are found in a variety of habitats, including forests, grasslands agricultural areasand near human settlements ((Zoological Survey of India 2002)). Pangolins are basically nocturnal animals, which means they are most active during the night. The Indian pangolin is a highly adaptable species found across a range of habitats within the Indian subcontinent. Indian pangolins are often associated with forested areas, including both tropical and deciduous forests. The dense vegetation provides ample cover also inhabit grassland areas, particularly when they have access to sufficient ant and termite populations in these habitats, which are the pangolin's primary food source. They may be found in savannas, grassy clearings within forests, or areas with a mix of grassland and trees. Pangolins sometimes venture into agricultural areas and cultivated lands, especially if they can find a suitable supply of ants and termites. However, this can bring them into conflict with humans, as they may damage crops or become victims of poaching due to their presence in these human-altered landscapes. Riparian areas near water sources, such as rivers and streams, can also be suitable habitats for Indian pangolins, as they provide water and often have high insect populations. Pangolins also found in hilly and mountainous terrain, as long as suitable food sources are present. Their ability to climb trees and adapt to varied elevations allows them to inhabit such areas. In some cases, Indian pangolins can adapt to human-altered environments, including urban areas or agricultural landscapes, although these situations can expose them to various threats, including habitat destruction and poaching. Conservation efforts are vital to protect these adaptable creatures and their habitats, especially in the face of ongoing habitat loss and the illegal wildlife trade.

**Diet:** Pangolins are insectivorous mammals and their diet primarily consists of ants and termites. They are highly specialized for feeding on these insects, and their diet is well-suited to their anatomy and behavior. Pangolins are primarily specialized for consuming ants and termites. They have a long, sticky tongue that can extend well beyond their snout, allowing them to reach deep into ant and termite nests. The tongue is covered with sticky saliva that helps them capture and ingest the insects. Pangolins are nocturnal creatures and are highly adapted for digging into termite mounds and ant nests. They use their strong front claws to break into the nests and their long, flexible tongues allow them to extract the insects. They can consume a large number of ants and termites in a single feeding session. Pangolins are not very selective in terms of the specific species of ants and termites they consume. They feed on a variety of species found in their habitat. Unlike some other insectivorous animals, pangolins are strict insectivores and do not consume vegetation or other food sources. Their digestive system is adapted to a diet of insects, and they lack the ability to digest plant material. Pangolins



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obtain the majority of their water from the insects they consume and they have adapted to minimize their water requirements. They rarely drink water directly and their diet helps meet their hydration needs. Hence pangolins are vital for ecosystem health because they help control insect populations, particularly ants and termites. Their specialized diet and foraging behavior contribute to pest control, making them important in maintaining a balance in their ecosystems (Ma et al 2017).

**Conservation Status:** The Indian pangolin is presently mentioned as "Endangered" on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. This status reflects the significant threats the species faces and the urgency of conservation efforts to protect it. Indian pangolins, like other pangolin species, are threatened by habitat loss and poaching. They are in high demand in illegal wildlife trade due to the supposed medicinal and aphrodisiac properties of their scales. As a result, pangolins are listed on international conservation lists, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES-I), which restricts their trade. Indian pangolins are highly sought after for their scales, which are believed to have medicinal properties in some traditional Asian medicines and their meat is considered a delicacy in some regions. This has led to rampant poaching and illegal trade, severely impacting pangolin populations.

**Threats:** Unfortunately, pangolins are under threat due to habitat loss and illegal wildlife trade, driven by the demand for their scales and meat in some traditional medicines and for their scales in the fashion industry. Pangolinsare highly vulnerable towards wildlife crime in world after Elephants, Rhinos and tiger (Patel et al., 2015; Gaubert et al., 2017). They are the most trafficked wild animal in the world (Zhou et al., 2014), because of the high demand in south east countries for aphrodisiac and medicinal value. Approximately over 100,000 pangolins captured illegally every year. Conservation efforts are critical to protect these unique and ecologically important mammals. Habitat destruction due to deforestation, urbanization and agricultural expansion is a significant threat to Indian pangolins. As their natural habitats are degraded and fragmented, pangolins have fewer places to find food and seek shelter. Pangolins sometimes venture into agricultural areas and may come into conflict with humans when they damage crops. In such situations, they can be killed or captured. Limited awareness about the importance of pangolins and their role in ecosystems contributes to their vulnerability. Many people are unaware of the threats pangolins face and may not understand the importance of their conservation.

**Reproduction:** Reproduction in pangolins is an interesting process that differs somewhat from many other mammals. Mating in pangolins generally occurs during their breeding season,



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which varies depending on the species and location but often takes place during the rainy season. It is believed that pangolins use scent marking and vocalizations to communicate and locate potential mates. After successful mating, the female pangolin has a gestation period typically ranges from about 70 to 150 days, depending on the species (Hua et al., 2015). Female pangolins usually give birth to a single offspring, although twins are known to occur on rare occasions. The young pangolins are called pangolins or pangolinettes. Pangolins are born relatively undeveloped. They are small and weigh only a fraction of the mother's weight. At birth, they are covered in soft and fine hair instead of the protective scales found on adults. The mother pangolin provides extensive care to her offspring. She carries her baby on her back and provides milk through mammary glands. The milk is secreted into a groove on the mother's abdomen, and the young pangolin laps it up. The young pangolin relies on its mother for nourishment and protection. It clings to its mother's back, holding on to her protective scales. As it grows, the soft hair begins to harden into scales. This hardening process takes several months. Over time, the young pangolin becomes more independent, gradually reducing its reliance on its mother. It learns to forage for ants and termites, the primary diet of pangolins, as well as other survival skills. The exact age at which a young pangolin becomes fully independent can vary among species and individuals. Pangolins are relatively solitary animals and the interaction between mother and young is essential for the survival and development of the offspring (Dickman 1884), While the process of reproduction and maternal care in pangolins is different from many other mammals, it reflects the unique adaptations of these creatures to their environment and lifestyle as insectivorous, nocturnal animals.

**Behavior:** Pangolins are solitary animals and are known for their shy and reclusive nature. When threatened, they can curl into a ball, making it difficult for predators to access their soft underbelly. They have poor eyesight but a strong sense of smell to locate prey. Pangolins are nocturnal and have a relatively low activity level during the day. Their scaly and muted coloration can help them blend into their surroundings, providing a level of camouflage that helps them avoid detection by predators (Mohapatra and Panda2013).

**Conservation Efforts**: Conservation efforts for pangolins are crucial due to the significant threats they face, including habitat loss and the illegal wildlife trade. These efforts involve a combination of legal protection, habitat preservation, research, awareness campaigns, and international collaboration. Many countries have laws and regulations in place to protect pangolins from hunting, trade, and poaching. These laws make it illegal to capture, kill, or trade pangolins and their products. Strengthening and enforcing these regulations is a critical step in pangolin conservation. Pangolins are listed in Appendix I of the Convention on International



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Trade in Endangered Species of Wild Fauna and Flora (CITES-I), which bans international commercial trade in pangolins and their parts (Mahmood et al 2019). This international agreement helps regulate and monitor the international trafficking of pangolins. Preserving the natural habitats of pangolins is vital for their survival. Creating protected areas and wildlife corridors helps ensure that pangolins have suitable habitats to live and forage in. Efforts are made to rescue and rehabilitate pangolins confiscated from the illegal wildlife trade or those injured due to human-wildlife conflict. Rehabilitated pangolins are often released back into the wild. Ongoing research helps conservationists understand pangolin behavior, ecology and distribution. Given information is important for understanding effective conservation strategies. Raising public awareness about the importance of pangolins and the threats they face is an essential component of pangolin conservation. Education campaigns inform local communities, as well as the broader public, about pangolins and their role in ecosystems. Efforts are also made to reduce the demand for pangolin products, such as their scales and meat, through awareness campaigns targeting consumers. Education is key to dispelling myths about the supposed medicinal and aphrodisiac properties of pangolin products. International and local collaboration among governments, conservation organizations, and communities is critical for the success of pangolin conservation efforts. Research into pangolin breeding and reproduction is also important to better understand their life cycle and to support breeding programs for the conservation of pangolins in captivity.

Efforts to protect Indian pangolins include establishing protected areas and wildlife corridors, enforcing anti-poaching laws, raising awareness about the importance of pangolins in ecosystems and working to reduce the demand for pangolin products in traditional medicine and the illegal wildlife trade. Conservationists are working tirelessly to protect pangolins and their habitats. While the challenges are significant, the efforts to conserve these unique and threatened animals are making a difference. Public support, increased awareness, and strict enforcement of anti-poaching laws are essential to the success of pangolin conservation.

**Intermediate link or missing link between reptiles and mammals**-Pangolins are often referred to as an intermediate link or missing link between reptiles and mammals due to certain primitive characteristics they possess. This is primarily because of their unique features and evolutionary history. However, pangolins are mammals, and their lineage diverged from that of other mammals a long time ago. They are not direct intermediates between reptiles and mammals. The specific primitive features they share with some early mammalian and reptilian ancestors. The concept of pangolins being intermediate or primitive is not related to their evolutionary role between reptiles and mammals but rather to specific characteristics and



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adaptations that set them apart from most other mammals. They are indeed a unique and fascinating group of mammals with distinct features and behaviors.

Indian pangolins, like all pangolin species, are important for maintaining ecological balance by controlling insect populations. Their conservation is crucial to ensuring the health of ecosystems in the Indian subcontinent and safeguarding these unique and threatened animals.

**Diseases:** Pangolins, when confiscated or rescued, are usually in poor health with injuries, stress, infections, and infestation with parasites, responsible for their morbidity and mortality. Pangolins can be susceptible to a range of diseases, some of which can impact their health and populations (Mohapatra et al 2020). It's important to note that while there is limited information on specific diseases in wild pangolin populations, pangolins, like all wildlife, can be exposed to various pathogens in their environment. Pangolins can carry zoonotic diseases, which are infectious diseases that can be transmitted from animals to humans. These diseases may include bacteria, viruses and parasites. There has been concern about pangolins serving as potential intermediate hosts for viruses such as coronaviruses, including those linked to zoonotic outbreaks like COVID-19. Like other mammals, pangolins can suffer from respiratory infections, including pneumonia. These infections can be caused by various pathogens and may result from environmental stressors. Pangolins can also harbor internal parasites like tapeworms and roundworms, as well as external parasites such as ticks and fleas. These parasites can affect the health and well-being of the animals. Depending on the region, pangolins may be exposed to vector-borne diseases carried by arthropods like ticks and mosquitoes. These diseases can include pathogens like malaria and various types of encephalitis. Tuberculosis, can affect pangolins. These infections can cause respiratory and systemic symptoms and are of concern not only for the health of pangolins but also for potential transmission to humans. It's essential to understand that the prevalence and impact of these diseases in wild pangolin populations may not be well-documented due to the secretive and elusive nature of these animals. Additionally, more research is needed to better understand the diseases that affect pangolins and their potential role as reservoirs for zoonotic diseases. Moreover, the illegal wildlife trade can exacerbate the risk of disease transmission, making the conservation of pangolins and their habitats an important component of preventing zoonotic outbreaks.

**Conclusions:** Pangolins are remarkable and unique creatures that play a crucial role in their ecosystems by helping to control ant and termite populations. Their specialized adaptations, such as protective scales and a long, sticky tongue, make them well-suited for their



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insectivorous diet. However, these fascinating animals are facing numerous threats, primarily due to habitat loss and the illegal wildlife trade. It has been observed that decrease in the number of pangolins that feed on ants and termites, leads to hollowing of the ground which results damage to vegetation of that area, ultimately affects the ecosystem of that area adversely (RanaandKumar2023). Conservation efforts are essential to protect pangolins and ensure their survival. These efforts include legal protection, habitat preservation, anti-poaching measures, research, and awareness campaigns. International cooperation is critical to combat the illegal trade in pangolins and education and public awareness are vital to reducing the demand for pangolin products. Pangolins are currently listed as endangered species, and their conservation status highlights the urgency of these efforts. While challenges remain, there is hope for the preservation of pangolins and the valuable role they play in maintaining the health of ecosystems. Collaborative efforts by governments, conservation organizations, and communities are essential in securing a future for these unique and endangered creatures.

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