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BEHAVIOURAL ECOLOGY OF WHITE TIGERS WITH SPECIAL REFERENCE TO REWA, MADHYA PRADESH

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ABSTRACT

This study explores the behavioural ecology of white tigers (Panthera tigris leucistic morph), focusing on their origin in Rewa, Madhya Pradesh (India), developmental history, behavioural traits, ecological roles, and conservation significance. The white tiger is not a separate species but a genetic colour morph of the Bengal tiger (P. t. tigris), caused by a recessive gene (leucism). The white tiger's behavioural ecology including foraging, social interaction, reproductive behaviour, adaptability, and interaction with humans is examined through field records, captive observations, and conservation data. Though white tigers are a symbol of Rewa's natural heritage, their ecological value remains controversial due to genetic issues and reduced survival fitness in wild habitats.

KEYWORDS: *White Tiger, Behavioural Ecology, Feeding Ecology, Reproductive Behaviour and Conservation Biology.*

INTRODUCTION

The tiger (*Panthera tigris*) is one of the most iconic and ecologically significant apex predators of the Asian forests, playing a crucial role in maintaining the structure and function of terrestrial ecosystems. Among its various subspecies and phenotypic variations, the white tiger has attracted exceptional scientific, cultural, and public interest due to its rare coloration and historical association with central India, particularly the Rewa region of Madhya Pradesh. The white tiger is not a distinct subspecies but a leucistic colour morph of the Bengal tiger (*Panthera tigris tigris*), resulting from a recessive genetic trait that affects pigmentation. This rare phenotype, characterized by white or pale cream fur with dark stripes and blue eyes, has made the white tiger a subject of fascination, conservation debate, and behavioural ecological inquiry.

Behavioural ecology examines the relationship between an organism's behaviour and its environment, emphasizing how behavioural traits contribute to survival and reproductive success. In the case of white tigers, behavioural ecology becomes especially important because their unusual coloration may influence hunting efficiency, social interactions, territoriality, and adaptability to natural

habitats. Tigers are primarily solitary, territorial, and ambush predators whose behavioural strategies are finely tuned to their forested and grassland environments. Any deviation from the normal adaptive traits—such as the loss of cryptic coloration raises questions about ecological fitness and long-term survival in the wild. Thus, the study of white tigers offers a unique opportunity to understand how genetic variation interacts with behavioural and ecological constraints.

The historical significance of Rewa in the context of white tigers is unparalleled. In 1951, a white tiger cub later named *Mohan* was captured from the forests near Rewa by Maharaja Martand Singh Judeo. This event marked the beginning of global awareness about white tigers, as Mohan became the progenitor of nearly all white tigers found in captivity across the world today. The forests of Rewa and its surrounding landscapes once supported a healthy population of Bengal tigers, making the region an important centre for tiger conservation and historical wildlife management practices. Over time, the association of Rewa with white tigers evolved from a natural occurrence to a symbol of regional pride, tourism, and ex-situ conservation efforts. From an ecological perspective, the occurrence of white tigers in the wild has always been extremely rare. Their conspicuous coloration reduces camouflage in dense forest environments, potentially affecting their success as ambush predators. Behavioural adaptations such as stalking techniques, prey selection, and activity patterns may differ subtly from those of normally coloured tigers, particularly under captive or semi-natural conditions. Moreover, most existing white tigers are products of selective breeding and inbreeding in captivity, which raises concerns regarding genetic health, behavioural abnormalities, and reduced ecological competence. Studying their behavioural ecology helps in distinguishing natural behavioural traits from those shaped by artificial environments.

The conservation value of white tigers remains a subject of debate among wildlife biologists and conservationists. While white tigers serve as powerful flagship animals for public awareness and wildlife tourism, they do not contribute directly to the conservation of wild tiger populations. On the contrary, intensive breeding for the white trait may divert resources from habitat protection and genetic conservation of wild Bengal tigers. In this context, understanding the behavioural ecology of white tigers specially in relation to their origin in Rewa is essential for developing informed conservation policies and ethical wildlife management practices. Therefore, this study aims to provide a comprehensive overview of the behavioural ecology of white tigers with special reference to Rewa, Madhya Pradesh. By integrating historical records, behavioural observations, ecological principles, and conservation perspectives, the paper seeks to highlight the adaptive limitations, ecological role, and symbolic importance of white tigers. Such an understanding is crucial not only for academic research but also for guiding future conservation strategies that balance scientific integrity, ethical responsibility, and public engagement in wildlife conservation.

OBJECTIVE OF THE STUDY:

This paper aims to:

1. Document the behavioural traits of white tigers.
2. Analyse ecological interactions within their environment.
3. Assess conservation issues, specially in the context of Rewa.

Taxonomic Position:

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Felidae
Genus	Panthera
Species	*Panthera tigris*
Subspecies	*P. t. tigris*
Morph	Leucistic Bengal tiger

Genetic Colour Morph:

The white tiger is a rare genetic colour morph of the Bengal tiger (*Panthera tigris tigris*) caused by a recessive leucistic gene that results in partial loss of pigmentation, producing a white or pale cream coat with dark stripes and blue eyes. This condition differs from albinism, as melanin is not completely absent and normal stripe patterns are retained. The genetic basis of this colour variation is associated with mutations in the SLC45A2 gene, which affects melanin transport and deposition. In natural habitats, the white coloration reduces camouflage efficiency, negatively influencing hunting success and survival, which explains the extreme rarity of white tigers in the wild. Most existing white tigers descend from a narrow captive lineage originating in Rewa, where selective breeding and inbreeding were used to preserve the white trait, often resulting in genetic health issues. Consequently, while the white tiger has great cultural and symbolic significance, particularly in Rewa, its colour morph offers no adaptive advantage in natural ecosystems and persists mainly due to human intervention.

Historical Context:

The historical significance of the white tiger is closely associated with the forests of Rewa, Madhya Pradesh, which occupy a unique place in the wildlife history of India. Prior to the mid-twentieth century, the Rewa region, including parts of present-day Rewa, Satna, and Sidhi districts, was characterized by extensive forest cover and supported a healthy population of Bengal tigers. Occasional sightings of unusually pale or white tigers were recorded in local folklore and hunting accounts, but these remained largely unverified until the early 1950s. A major turning point occurred in 1951, when Maharaja Martand Singh Judeo of Rewa captured a white tiger cub from the forests near Bargadi village. The cub, later named *Mohan*, survived and was successfully raised in captivity, marking the first documented instance of a live white tiger being preserved. This event attracted global scientific and public attention, establishing Rewa as the birthplace of the modern white tiger lineage. Through controlled breeding programmes, Mohan produced several offspring, many of whom carried or expressed the white gene, leading to the spread of white tigers to zoological parks across India and abroad.

During the post-independence period, white tigers gradually became symbols of prestige, royal legacy, and later wildlife tourism. However, this phase also coincided with extensive habitat loss and decline of wild tiger populations in central India. While white tigers gained prominence in captivity, their presence in the wild diminished, highlighting a shift from natural occurrence to human-managed conservation and display. In recent decades, the historical legacy of white tigers has been institutionalized through initiatives such as the Maharaja Martand Singh Judeo White Tiger Safari and Zoo at Mukundpur, inaugurated in 2016 near Rewa. Thus, the historical context of white tigers reflects a transition from rare natural phenomenon to cultural icon, raising important questions about

conservation priorities, genetic integrity, and the role of history in shaping wildlife management practices.

Behavioural Ecology:

Behavioural ecology of the white tiger is largely similar to that of the Bengal tiger (*Panthera tigris tigris*), as the white tiger is not a separate species but a colour morph. Tigers are solitary, territorial, and primarily nocturnal or crepuscular animals whose behaviour is closely adapted to forest and grassland ecosystems. Adult white tigers establish and defend large territories using scent marking, scratch marks, and vocalizations such as roars to communicate their presence and reproductive status. Males generally maintain larger territories that may overlap with those of several females, while females occupy smaller, resource-rich areas that support cub rearing.

Feeding behaviour of white tigers follows the typical ambush predation strategy of tigers, relying on stealth, short bursts of speed, and powerful attacks to capture prey such as deer, wild boar, and other medium to large ungulates. However, the pale coat of white tigers reduces their camouflage effectiveness in natural forest environments, potentially affecting hunting success in the wild. This limitation suggests that white tigers may require greater energy expenditure during hunting or may depend more heavily on favourable environmental conditions, such as low light or dense cover, to successfully capture prey. In captive or semi-natural settings, where food is provided, this ecological disadvantage is largely masked.

Social behaviour in white tigers remains minimal, as with all tigers, with interactions mainly restricted to mating periods and maternal care. Female white tigers exhibit strong maternal instincts, providing prolonged care, protection, and behavioural training to their cubs for nearly two years. Cubs learn essential survival skills through observation and play, although captive conditions may limit the development of natural hunting and territorial behaviours. Reproductive behaviour in white tigers does not differ significantly from that of orange tigers, but inbreeding in captive populations has sometimes resulted in reduced fertility and increased cub mortality. From an ecological perspective, white tigers illustrate the close relationship between behaviour, genetics, and environment. Their behavioural patterns are fundamentally those of apex predators, yet their unusual coloration reduces ecological efficiency and adaptability in the wild. Consequently, white tigers hold limited ecological significance in natural ecosystems and are primarily sustained in captive environments. Understanding their behavioural ecology is important for evaluating the biological limitations of colour morphs and for informing ethical conservation strategies, particularly in regions like Rewa, where white tigers are historically and culturally significant.

Physiological and Ecological Impacts of Leucism:

Leucism in white tigers has significant physiological and ecological implications that influence their survival, behaviour, and overall fitness. Physiologically, leucism results in partial loss of pigmentation without affecting melanin production in the eyes and skin completely. However, the genetic mutations responsible for this condition are often linked with a narrow gene pool, especially in captive populations where selective breeding has been practiced. As a result, white tigers frequently exhibit inherited health problems such as strabismus (crossed eyes), skeletal deformities, dental abnormalities, reduced fertility, and weakened immune systems. These physiological constraints can affect sensory perception, locomotion, and stress tolerance, ultimately influencing their behavioural responses and longevity. From an ecological standpoint, the most significant impact of leucism is the loss of effective camouflage. The orange coat with black stripes of the Bengal tiger provides excellent concealment in forested and grassland habitats, allowing efficient ambush predation. In contrast, the white or pale coat of leucistic tigers makes them more visible to prey, particularly during daylight

hours, reducing hunting success and increasing energy expenditure. This disadvantage limits their ability to survive independently in the wild and explains the extreme rarity of white tigers in natural ecosystems. Their conspicuous appearance may also increase vulnerability to detection by humans, potentially raising the risk of conflict or poaching in open habitats.

Leucism can further influence thermoregulation and habitat use. While lighter coloration may reflect sunlight and offer minor benefits in cold or snowy environments, such advantages are negligible in the tropical and subtropical forests of central India. Consequently, white tigers do not gain any meaningful ecological benefit from their coloration in regions such as Rewa. Instead, they must rely on behavioural adjustments, such as increased nocturnal activity or use of dense vegetation, to compensate for reduced concealment. Overall, leucism represents a biologically non-adaptive trait in the ecological context of Indian tiger habitats. While white tigers continue to attract public attention and serve as cultural and tourism symbols, their physiological vulnerabilities and ecological limitations underscore the importance of conserving genetically healthy wild tiger populations. Understanding the impacts of leucism is essential for developing responsible conservation policies that prioritize ecological fitness and long-term species survival over aesthetic appeal.

Conservation Implications :

The conservation implications of white tigers are complex and often controversial, as they lie at the intersection of genetics, ethics, ecology, and public perception. White tigers do not constitute a separate subspecies and therefore hold limited value in terms of conserving the genetic diversity of wild tiger populations. Most existing white tigers descend from a small, inbred captive lineage, which raises serious concerns about genetic health, long-term viability, and animal welfare. Breeding programs focused on maintaining the white colour morph may inadvertently promote inbreeding, leading to physiological defects, reduced fertility, and compromised immunity. From an ecological perspective, white tigers have minimal relevance to in-situ conservation. Their reduced camouflage and associated ecological disadvantages make them poorly suited for survival in natural forest ecosystems. Consequently, they cannot be effectively reintroduced into the wild or contribute to the restoration of natural tiger populations. Conservation resources invested in maintaining white tigers in captivity may divert attention and funding from more urgent priorities, such as habitat protection, anti-poaching measures, and conservation of genetically robust wild Bengal tigers.

However, white tigers also serve as powerful flagship animals that attract public interest and promote wildlife tourism, particularly in regions like Rewa, Madhya Pradesh. Facilities such as the Mukundpur White Tiger Safari have increased awareness about tiger conservation and generated economic benefits for local communities. When managed responsibly, such institutions can function as educational platforms that communicate broader conservation messages, including the importance of habitat preservation and biodiversity protection.

Therefore, conservation strategies involving white tigers should emphasize ethical management, scientific transparency, and public education rather than selective breeding. White tigers should be maintained primarily as cultural and educational symbols, while conservation efforts should remain focused on protecting wild tiger populations and their habitats. Integrating the historical legacy of white tigers with modern conservation science can help ensure that public fascination contributes positively to biodiversity conservation rather than undermining it.

DISCUSSION :

The behavioural ecology of white tigers presents an important case study in understanding the interaction between genetics, behaviour, and environmental adaptation. Although white tigers exhibit behavioural patterns largely similar to those of normal orange Bengal tigers such as solitary living,

territoriality, and ambush-based hunting their leucistic coloration introduces ecological constraints that limit their adaptive efficiency in natural habitats. Reduced camouflage compromises hunting success and increases energy expenditure, thereby lowering survival prospects in the wild. This highlights how even a single genetic variation, when maladaptive, can significantly influence ecological fitness.

The historical association of white tigers with Rewa underscores the role of human intervention in shaping wildlife populations. What was once a rare natural occurrence has evolved into a managed captive phenomenon driven by aesthetic appeal, tourism, and cultural symbolism. Selective breeding to maintain the white trait has resulted in a narrow genetic base, leading to inherited physiological defects and altered behavioural responses in some individuals. These outcomes reinforce concerns raised by conservation biologists regarding the ethical implications of breeding animals for appearance rather than ecological viability. From a conservation standpoint, white tigers illustrate the limitations of ex-situ conservation when it is not aligned with genetic and ecological priorities. While they function effectively as flagship species that generate public interest and awareness, they do not contribute directly to the recovery or sustainability of wild tiger populations. The challenge lies in balancing public fascination with scientific responsibility. Institutions housing white tigers must therefore focus on education and conservation messaging, emphasizing that true tiger conservation depends on protecting habitats, prey base, and genetic diversity.

CONCLUSION:

The study of the behavioural ecology of white tigers, with special reference to Rewa, Madhya Pradesh, highlights the complex relationship between genetics, behaviour, ecology, and human intervention. White tigers are not a distinct subspecies but a rare leucistic colour morph of the Bengal tiger, whose existence in the wild has always been extremely limited due to ecological disadvantages such as reduced camouflage and lower hunting efficiency. Although their fundamental behavioural traits—territoriality, solitary nature, feeding strategies, and reproductive behaviour—remain similar to those of normal orange tigers, their unusual coloration and associated genetic constraints significantly reduce their adaptive fitness in natural environments.

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