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<https://www.youtube.com/watch?v=0EhK7U0yQdg>

Animal welfare assessment and implementation of environmental enrichment in captive felines

Estimación del bienestar animal e implementación de enriquecimiento ambiental en félidos en cautiverio



Encinas-García Lizeth ^{ID}, Urrea-Quezada Alejandro ^{ID}, Nieblas-López Manuel ^{ID}, Zamorano-Algandar Ricardo ^{ID}, Celaya-Michel Hernán ^{ID}, Osuna-Chávez Reyna*^{ID}



Universidad de Sonora. Carretera a Bahía de Kino km. 21.5, Hermosillo, Sonora, México. *Author for correspondence: Osuna-Chávez Reyna. Email: encinasglizeth@gmail.com, alejandro.urrea@unison.mx, manuel.nieblas@unison.mx, ricardo.zamorano@unison.mx, hernan.celaya@unison.mx, reyna.osuna@unison.mx

ABSTRACT

Animal welfare in captive wildlife represents an ongoing challenge for Wildlife Management Units (WMUs), particularly in species with nocturnal habits and wide-ranging behavior such as wild felids. The aim of this study was to describe the behavior of eight captive wild felids and to document their behavioral response following the implementation of environmental enrichment, using direct observation and ethograms. The study was conducted in a WMU located in northern Sonora, Mexico. Behavioral categories related to locomotion, resting, exploration, feeding, interaction with the environment, and repetitive behaviors were recorded before and after the application of different environmental enrichment strategies. The results revealed interspecific and individual variability in behavioral repertoires, as well as observable changes in the frequency of certain behaviors, particularly those associated with exploration and interaction with the environment after enrichment implementation. However, persistence of repetitive behaviors was observed in some individuals. The descriptive analysis of animal welfare, based on behavioral indicators and human management components, indicated an overall medium-level animal welfare category, with higher values in species showing greater behavioral diversity following environmental enrichment. The findings should be interpreted exclusively from a behavioral perspective, as physiological stress indicators were not assessed.

Keywords: animal welfare, environmental enrichment, wild felids, behavior, wildlife management units.

RESUMEN

El bienestar animal en fauna silvestre bajo cuidado humano representa un reto relevante para las Unidades de Manejo para la Conservación de la Vida Silvestre (UMAs), especialmente en especies con hábitos nocturnos y amplios rangos de desplazamiento, como los félidos silvestres. El objetivo de este estudio fue describir el comportamiento de ocho félidos silvestres en cautiverio y documentar su respuesta conductual posterior a la implementación de enriquecimiento ambiental, mediante observación directa y el uso de etogramas. El estudio se llevó a cabo en una UMA ubicada en el norte de Sonora, México. Se registraron conductas asociadas a locomoción, descanso, exploración, alimentación, interacción con el entorno y conductas repetitivas, antes y después de la aplicación de diferentes estrategias de enriquecimiento



ambiental. Los resultados mostraron variabilidad interespecífica e individual en el repertorio conductual, así como modificaciones observables en la frecuencia de algunas conductas, particularmente aquellas relacionadas con la exploración y la interacción con el entorno, posteriores a la aplicación del enriquecimiento ambiental. No obstante, en ciertos ejemplares se observó persistencia de conductas repetitivas. El análisis descriptivo del bienestar animal, basado en indicadores conductuales y de manejo humano, indicó una categoría promedio de bienestar animal media, con valores más elevados en especies que presentaron mayor diversidad conductual posterior al enriquecimiento. Los resultados deben interpretarse exclusivamente desde un enfoque conductual, ya que no se evaluaron indicadores fisiológicos.

Palabras clave: bienestar animal, enriquecimiento ambiental, félidos silvestres, comportamiento, UMAs.

INTRODUCTION

In recent decades, the role of zoos and conservation centers has evolved significantly, shifting from merely recreational spaces toward institutions with educational, scientific, and biodiversity conservation functions. In this context, animal welfare assessment has become a central component in the management of wildlife under human care, particularly in species highly sensitive to captive conditions, such as felids (Mota *et al.*, 2016; Broom, 2011). Animal welfare is defined as the state in which an individual is able to maintain its physical and mental health, express species-typical behaviors, and adapt appropriately to its environment (Broom, 2011). In captive wild animals, behavioral alterations represent one of the most reliable indicators for detecting chronic stress and environmental deficiencies (Sanmiguel *et al.*, 2017). Among the main behavioral signs associated with compromised animal welfare are stereotypies. These are frequently used as a reliable indicator of a lack of animal welfare (Urrutia *et al.*, 2023). In captive felids, these aberrant behaviors commonly manifest as pacing, excessive vocalizations, or rocking, and have been widely documented in zoos across different regions (Sciabarrasi *et al.*, 2020; Urrutia *et al.*, 2023).

The implementation of environmental enrichment programs has proven to be an effective strategy to mitigate these behavioral alterations, as it promotes the expression of natural behaviors and encourages positive experiences within the captive environment (Young, 2003; Ellis, 2009). Such programs must be designed considering the biological, ethological, and ecological characteristics of each species, as well as the specific conditions of the enclosure and the individual. Under this approach, the present study aimed to assess animal welfare in different wild felid species kept in captivity in a WMU (Wildlife Conservation and Management Unit) located in northern Sonora, Mexico, using standardized ethograms, and to evaluate the impact of environmental enrichment implementation on the frequency and duration of observed stereotypies. Animal welfare in wildlife under human care constitutes a growing area of interest within veterinary medicine, applied ethology, and biological conservation. In the case of zoos and WMUs, animal welfare assessment represents an essential component of integrated



management, as captive conditions substantially modify the behavioral expression, spatial organization, and social interactions of individuals (Whitham & Wielebnowski, 2013).

Several conceptual frameworks have been proposed to assess animal welfare. Among these, the Five Domains model has gained relevance because it explicitly integrates the behavioral component and the animal's subjective experiences as a result of its interaction with the physical and social environment (Mellor & Beausoleil, 2015). This model recognizes that behavior not only reflects the animal's physical state but also its ability to adapt, explore, and respond flexibly to its environment, aspects particularly relevant to captive wild species. In felids, behavior constitutes one of the most sensitive indicators of welfare status, because these species have extensive home ranges, complex exploratory behaviors, and specific patterns of territorial marking and hunting under natural conditions (Clubb & Mason, 2003). Space restriction, low environmental complexity, and the absence of adequate stimuli in captivity can interfere with the expression of these behaviors and have favored the emergence of repetitive or stereotyped behaviors (Mason & Rushen, 2006).

Stereotypies are defined as repetitive, invariant behaviors that are apparently lacking adaptive function, typically arising in contexts where the animal faces persistent environmental constraints or limited opportunities to express species-typical behaviors (Mason & Rushen, 2006). In captive felids, these behaviors commonly manifest as continuous pacing along the perimeter of the enclosure, body rocking, or repeated vocalizations, and have been documented in both large and small felids housed in zoos around the world (Clubb & Mason, 2003; Skibieli *et al.*, 2007). Systematic recording of these behaviors using ethograms is a fundamental tool for animal welfare assessment, as it allows the identification of normal and abnormal behavioral patterns, as well as the quantification of changes associated with modifications in management or the environment (Altmann, 1974; Martin & Bateson, 2007). Ethological observation, being a non-invasive method, is particularly suitable for studies on wildlife, where direct manipulation can introduce additional behavioral biases.

Within management strategies aimed at improving animal welfare in captivity, environmental enrichment has become a key tool. Environmental enrichment is defined as the deliberate modification of the animal's environment with the objective of increasing environmental complexity, promoting the expression of natural behaviors, and thereby reducing the occurrence of abnormal behaviors (Carlstead & Shepherdson, 2000). This approach is not merely intended to distract the animal, but to stimulate cognitive, sensory, and motor processes that are part of its natural behavioral repertoire. In felids, several studies have documented that the implementation of physical, sensory, and food-based environmental enrichments can increase exploration, play, sniffing, and object manipulation, as well as reduce the frequency and duration of stereotypies (Skibieli *et al.*, 2007; Castillo *et al.*, 2012). However, the response to environmental enrichment may vary between species and individuals, depending on factors such as age, previous captive



history, enclosure design, and regularity of stimulus application (Whitham & Wielebnowski, 2013).

Furthermore, it has been noted that animal welfare assessment based solely on physical or health conditions is insufficient, as clinically healthy animals may exhibit significant behavioral alterations that reflect a compromise in their adaptation to the captive environment (Broom, 2011). Therefore, the integration of behavioral indicators into animal welfare monitoring programs is essential for a more complete and objective assessment. In this context, the combined use of ethograms and environmental enrichment programs not only allows the identification of behavioral problems but also enables applied evaluation of animal responses to environmental modifications. This approach is particularly relevant in regions where scientific information on animal welfare in wildlife is limited, such as northwestern Mexico, and provides useful elements for designing management strategies adapted to local conditions.

MATERIAL AND METHODS

Study area

The study was conducted in a Wildlife Conservation and Management Unit (WMU) located in the northern part of Sonora State, Mexico. The enclosures designated for the housing and exhibition of the felids had a natural substrate, shaded areas, shelters, and basic structural elements. The animals were kept under of the WMU routine management, with established feeding, cleaning, and veterinary supervision programs, with no modifications made during the study period.

Study animals

Initially, thirteen individuals belonging to different wild felid species were considered; however, the final behavioral analysis was conducted on eight individuals that had complete and continuous records throughout all observation sessions. The exclusion of the remaining specimens was due to visibility limitations, accessibility to the enclosures, and consistent availability during the monitoring periods, in order to guarantee the consistency of the behavioral data obtained.

The animals evaluated corresponded to the following species: *Panthera leo*, *Panthera tigris tigris*, *Panthera onca*, *Puma concolor*, *Leopardus pardalis*, and *Felis silvestris*. In the case of *Puma concolor*, two individuals were included; behavioral records were analyzed individually and subsequently averaged for presentation in the results. All animals were clinically stable and were not subjected to direct handling during the study.



Study design

A descriptive observational study with an applied, non-controlled intervention was carried out, aimed at assessing the behavior of captive felids under routine management conditions and documenting their behavioral response following the implementation of environmental enrichment. This type of design is widely used in animal welfare studies in wildlife, particularly when non-invasive methods are prioritized and small sample sizes are involved (Altmann, 1974; Martin & Bateson, 2007).

Behavioral recording and ethogram

Behavioral assessment was performed through direct observation using an ethogram specifically designed for this study, which included categories of locomotion, exploration, resting, feeding, interaction with the environment, and repetitive or stereotyped behaviors. The use of ethograms is a fundamental tool for animal welfare assessment, as it allows the systematic recording of the frequency and duration of relevant behaviors without interfering with the natural behavior of the individuals (Altmann, 1974; Martin & Bateson, 2007). Stereotypies were primarily identified as continuous pacing along the enclosure, repetitive vocalization, and body rocking, behaviors commonly described in felids kept in captivity (Mason & Rushen, 2006). Animal welfare assessment in animals under human care has evolved toward comprehensive approaches that consider both the animal component and the human component, integrating behavioral, social and management indicators. This type of approach has proven useful for the objective assessment of animal welfare in training and captivity contexts, allowing the identification of areas for improvement in animal management and the animal's environment (Maldonado *et al.*, 2022).

Observations were conducted in the morning (09:00–13:00 h), with 30-minute sessions per individual. Each specimen was observed in three sessions per day, accumulating a total of approximately nine hours of observation per individual. For recording in the ethogram, behaviors were considered by species, including the observed results of each individual within the species, in order to make more efficient use of the information obtained. During each session, the frequency and duration of observed behaviors were systematically recorded (Table 1).



Table 1. Occurrence frequency of the main behaviors observed per species during the period prior to the application of environmental enrichment

Species	Loc.	Ali.	Eli.	Oli.	Pos.	Des.	Groo.	Fro.	Jue.	Mar.	Inter.
First monitoring session											
<i>Panthera leo</i> .		X			X		X				
<i>Puma concolor</i> .		X			X	X	X		X		
<i>Panthera tigris tigris</i> .	X	X	X		X	X					
<i>Leopardus pardalis</i> .	X	X	X								
<i>Felis silvestris</i> .	X	X	X		X		X				
<i>Panthera onca</i> .											
<i>Panthera onca</i> (melanism).					X	X					
Second monitoring session											
<i>Panthera leo</i> .	X				X						
<i>Puma concolor</i> .					X						
<i>Panthera tigris tigris</i> .					X	X					
<i>Leopardus pardalis</i> .						X					
<i>Felis silvestris</i> .					X	X					
<i>Panthera onca</i> .		X	X		X	X					
<i>Panthera onca</i> (melanism).	X	X			X	X	X		X		
Third monitoring session											
<i>Panthera leo</i> .	X			X	X	X	X				
<i>Puma concolor</i> .					X	X	X				
<i>Panthera tigris tigris</i> .	X	X			X				X		
<i>Leopardus pardalis</i> .											
<i>Felis silvestris</i> .	X				X		X				
<i>Panthera onca</i> .		X					X				
<i>Panthera onca</i> (melanism).	X	X			X				X		
Total:	10	9	4	1	19	11	8	0	5	0	0

The values for *Puma concolor* represent the average of the two individuals evaluated. Exploration (Loc.), feeding (Ali.), elimination (Eli.), sniffing (Oli.), resting posture (Pos.), sleep habits (Des.), grooming (Groo.), play (Jue.), marking behavior (Mar.), and social or intentional interaction (Inter.)

Implementation of environmental enrichment

Following the initial behavioral assessment, environmental enrichment strategies were implemented, designed according to the characteristics of each species and the conditions of the enclosures. Environmental enrichment is conceived as a management tool aimed at increasing environmental complexity and favoring the expression of natural behaviors in captive wild animals (Carlstead & Shepherdson, 2000). The strategies included physical, sensory, and food-based enrichments, such as movable objects, hanging structures, food-hiding devices, and olfactory stimuli. The materials used were selected based on safety, availability, and ease of cleaning criteria, following general



recommendations for implementing environmental enrichment in zoos and WMUs (Skibieli *et al.*, 2007). The application of environmental enrichment was carried out during the WMU routine management, without altering the usual feeding or cleaning schedules. The behavioral response of the animals was recorded through direct observation on subsequent days, using the same observation protocol described previously.

Data analysis

The information obtained from the behavioral observations was organized into descriptive tables by species. The analysis was carried out descriptively, considering the frequency and duration of behaviors recorded before and after the environmental enrichment implementation. No statistical inferences were made due to the observational nature of the study and the sample size, in accordance with methodological approaches used in applied ethological studies on wildlife (Whitham & Wielebnowski, 2013). Spearman's correlation was selected due to the small sample size and the ordinal nature of the welfare scores.

Ethical considerations

The study was conducted without physical manipulation of the animals and without interfering with the routine management of the WMU. Observations were made from a distance to minimize the observer's influence on behavior. All activities were carried out in accordance with the general principles of animal welfare applicable to wildlife under human care (Broom, 2011).

RESULTS AND DISCUSSION

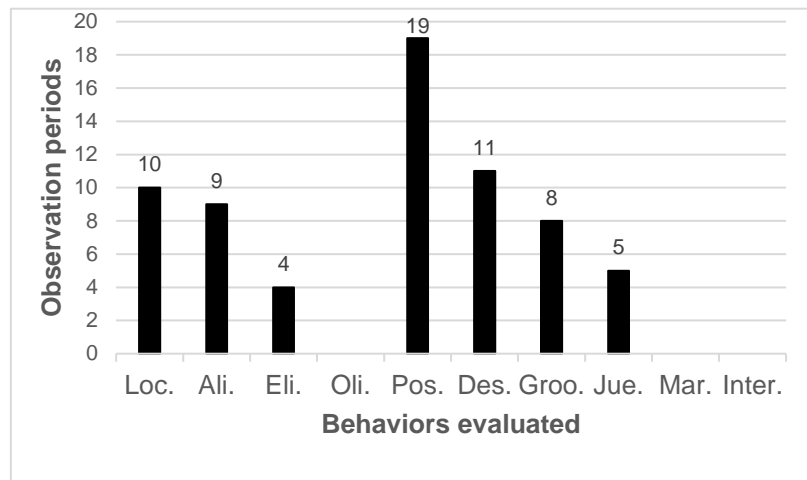
During the behavioral observation period, four individuals belonging to different species were identified as exhibiting evident stereotypies, primarily aimless continuous pacing and repetitive vocalization, which were quantified using a digital stopwatch. Overall, a low frequency of behaviors oriented toward environmental exploration was recorded, as well as little expression of play, exploration, and physical activity, particularly during the morning observation sessions. These observations should be interpreted considering the possible bias associated with the predominantly nocturnal and crepuscular habits of felids, given that the assessments were conducted in the morning.

Prior to the application of environmental enrichment (EE), the behaviors with the highest frequency of occurrence were resting and relaxation postures, with a total of 19 events recorded, followed by sleep habits and exploratory behaviors, with 11 and 10 records, respectively (Table 1). This behavioral pattern is consistent with that described in previous studies on captive felids, where passive behaviors predominate during diurnal observation periods (Sciabarrasi *et al.*, 2020). The low proportion of dynamic behaviors observed in



this study may be attributed, in part, to the evaluation schedule and the limited environmental stimulation prior to the intervention.

Figure 1 shows a low frequency of behaviors related to marking, sniffing, and environmental exploration, as well as intentional interactions, behaviors considered fundamental for the survival and adaptation of felids in natural conditions (Urrutia *et al.*, 2023). The reduction of these behaviors is consistent with limited environmental stimulation, which clearly allowed the identification of those behaviors susceptible to being promoted through the EE implementation.



Exploration (Loc.), feeding (Ali.), elimination (Eli.), sniffing (Oli.), resting posture (Post.), sleep habits (Des.), grooming (Groo.), play (Jue), marking behavior (Mar.), social or intentional interaction (Inter.)

Figure 1. Frequency of behaviors observed in wild felids prior to the application of environmental enrichment

Based on these observations, environmental enrichment strategies were selected to primarily stimulate exploration, marking, locomotion, and interaction with the environment, using sensory, locomotor, physical, and food-based enrichments. The materials used consisted of ecological, economical, and safe alternatives, such as cardboard, plastic bottles with rounded edges, jute, wood, and yarn, in order to facilitate the replicability of these strategies in other WMUs. For *Felis silvestris* and *Leopardus pardalis*, physical enrichments promoting locomotion were implemented, such as scratching posts and suspended rattle bottles, while for *Panthera tigris tigris* and *Panthera leo*, wooden platforms and sturdy hoses were used, respectively (Table 2).

The occurrence of locomotor stereotypies, primarily continuous pacing, was identified in individuals of all evaluated species, with higher frequency in *Felis silvestris*, *Panthera onca*, and *Leopardus pardalis*, as shown in Figure 2. These behaviors were not associated with pathological conditions, as there were no clinical records indicating neurological



alterations in the evaluated individuals. In this context, the manifestation of stereotypies could be related to factors such as restricted movement, absence of environmental stimuli, social isolation, or habituation to the environment, as has been described in behavioral studies on wildlife under human care (Mason & Rushen, 2006).

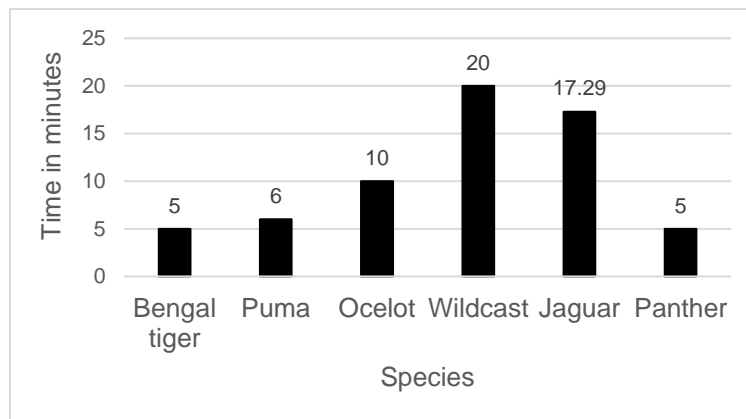


Figure 2. Occurrence of locomotor stereotypies by species during the observation period prior to the application of environmental enrichment



Table 2. Description of the behavioral reaction observed by species during the application of environmental enrichment, indicating the type of enrichment used and the associated behavioral objective

Day	Species	EE	EE objective	Obtained reaction
09/09/2023	<i>Felis silvestris</i> (wildcat) and <i>Leopardus pardalis</i> (Ocelot).	Hanger for bottles, rattle, and scratcher.	Physical activity, promoting natural behaviors such as play and claw sharpening.	Marking and sniffing behaviors were observed in <i>Felis silvestris</i> . No reaction was observed in <i>Leopardus pardalis</i> .
16/09/2023	<i>Panthera onca</i> and (adult jaguar and black panther*).	Fire hose, herbivore feces distribution, and surprise box.	Stimulate exploration and play behavior, arouse curiosity and interest in the environment, stimulate hunting behavior, and extend the feeding period.	Exploration, marking, and sniffing behaviors were observed, and the feeding period was extended in one of the individuals (jaguar).
23/09/2023	<i>Panthera onca</i> (Young jaguar)	Hanging bags, surprise box, herbivore feces distribution.	Stimulate exploration and play behavior, arouse curiosity and interest in the environment, and stimulate hunting behavior.	Exploration, play, marking, and sniffing behaviors were observed.
30/09/2023	<i>Puma concolor</i> (puma), <i>Panthera tigris tigris</i> (Bengal tiger) and <i>Panthera leo</i> (lion).	Surprise box and hanging bags, wooden platform, fire hose, and herbivore feces distribution.	Physical activity, promote play behavior, hunting behavior, arouse curiosity about the environment, promote locomotion, and extend the feeding period.	Exploration, marking, play, and sniffing behaviors were observed, and the feeding period was extended.

From left to right: observation day, species, environmental enrichment applied (EE), objective of the environmental enrichment, and reaction obtained. *The term "black panther" is used to differentiate the male specimen from the female specimen, the latter exhibiting melanism. However, both specimens belong to the species *Panthera onca*

Following the application of environmental enrichment, a variable behavioral response was observed among species. In the cases of *Leopardus pardalis* and *Felis silvestris*, stereotypic behaviors persisted, with 12 and 15 minutes of continuous pacing recorded, respectively, as shown in Figure 3. In the case of *Leopardus pardalis*, a slight increase in the duration of stereotypies was recorded compared to the pre-enrichment period, which could be related to the removal of the enrichment items once the observation session had ended. This type of response has been previously documented in captive felids subjected to intermittent environmental enrichment programs ([Sciabarrasi et al., 2020](#)).

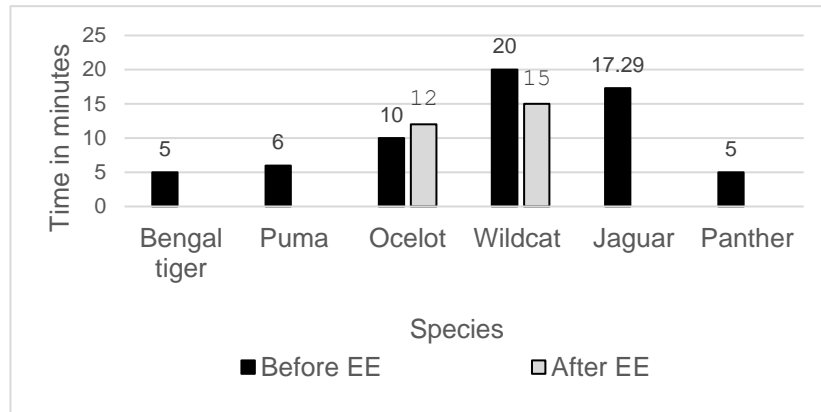


Figure 3. Manifestation of stereotypies by species before and after the application of environmental enrichment

Regarding the quantitative assessment of animal welfare, the analysis of the animal component included the variables of behavioral disorders, social needs, developmental needs, learning needs, and physiological needs. Particularly, for the variable "behavioral disorders," the following measurement scale was used: 60 points for individuals that exhibited behavioral disorders on 0 to 5 occasions, 20 points for those that exhibited them on 6 to 15 occasions, and 10 points for those that showed behavioral disorders on 16 to 20 occasions. This measurement scale was adapted from that used by [Maldonado *et al.*, \(2022\)](#). The results obtained showed descriptive values that varied among species, with lower scores in *Leopardus pardalis*, *Felis silvestris*, and *Panthera onca* (Table 3). These values are presented descriptively and should not be interpreted as a direct measurement of the animals' emotional or physiological state, but rather as a comparative tool based on observed behavioral indicators.

For the human component, the variables of animal selection, socialization, presence of stereotypies, care and welfare, and coexistence with human staff were considered. The results showed variability among species, with higher scores in *Panthera leo* and the melanistic specimen of *Panthera onca* (Table 4). The observed differences were mainly related to the frequency of stereotypies and the health history recorded during the observation period.



Table 3. Score obtained by species in the assessment of the animal component of animal welfare, based on behavioral variables and basic needs. Values are presented descriptively

Species	B.D	S.N	D.N	L.N	P.N	AW Total	AW Category
<i>Panthera leo</i> .	60	3	10	3	10	86	High
<i>Panthera tigris tigris</i> .	60	3	10	3	3	79	High
<i>Puma concolor</i> .	20	3	3	3	10	39	Medium
<i>Leopardus pardalis</i> .	20	3	3	3	3	32	Low
<i>Felis silvestris</i> .	10	3	10	3	3	29	Low
<i>Panthera onca</i> .	10	3	3	3	10	29	Low
<i>Panthera onca</i> (melanism).	60	10	10	3	3	86	High

Behavioral disorders (B.D), social needs (S.N), developmental needs (D.N), learning needs (L.N) and physiological needs (P.N)

Table 4. Score obtained by species in the assessment of the human component of animal welfare, based on variables related to handling, socialization, and care

Species	A.S	S	St	C&W	GC	AW Total	AW Category
<i>Panthera leo</i> .	20	2	20	20	20	82	High
<i>Panthera tigris tigris</i> .	20	2	20	2	20	64	Medium
<i>Puma concolor</i> .	20	2	2	2	20	46	Medium
<i>Leopardus pardalis</i> .	20	2	2	2	20	46	Medium
<i>Felis silvestris</i> .	20	2	2	20	20	64	Medium
<i>Panthera onca</i> .	20	2	2	20	20	64	Medium
<i>Panthera onca</i> (melanism).	20	20	20	20	20	100	High

From left to right: species, animal selection (A.S), socialization (S), stereotypies (St), care and welfare (C&W), good coexistence (G.C), total animal welfare score, and animal welfare category

The integration of both components allowed obtaining a descriptive sum of animal welfare (ΣAW), using a scale from 1 to 200 points (Table 5). Overall, the average animal welfare category among the evaluated species was medium, while *Panthera leo*, *Panthera tigris*,



and the melanistic specimen of *Panthera onca* achieved higher values. These results were consistent with the behavioral observations following the application of environmental enrichment, as no persistence of stereotypies was recorded in these species during the evaluated period.

Table 5. Distribution of the score obtained for the animal component, human component, and sum of animal welfare by species, with their respective final category

Species	AC (x)	HC (y)	ΣAW	Final AW category
<i>Panthera leo</i> .	86	82	168	High
<i>Panthera tigris tigris</i> .	79	64	143	High
<i>Puma concolor</i> .	39	46	85	Medium
<i>Leopardus pardalis</i> .	32	46	78	Medium
<i>Felis silvestris</i> .	29	64	93	Medium
<i>Panthera onca</i> .	29	64	93	Medium
<i>Panthera onca</i> (melanism).	86	100	186	High

From left to right: species, animal component, human component, sum of animal welfare, and final animal welfare Category

Finally, Spearman's correlation analysis showed a positive correlation of moderate magnitude ($\rho = 0.60$) between the animal component and the human component (Table 6), indicating a consistent relationship between human management conditions and the behavioral responses observed in the evaluated felids. This result is consistent with the importance of considering both components in an integrated manner when assessing animal welfare in wildlife under human care.

Table 6. Spearman's correlation between the animal and human components for the assessment of animal welfare in wild felids

Species	Rank x	Rank y	Difference (D)	D2
<i>Panthera leo</i> .	6.5	6.0	0.5	0.25
<i>Panthera tigris tigris</i> .	5.0	4.0	1.0	1.00
<i>Puma concolor</i> .	4.0	1.5	2.5	6.25
<i>Leopardus pardalis</i> .	3.0	1.5	1.5	2.25
<i>Felis silvestris</i> .	1.5	4.0	-2.5	6.25
<i>Panthera onca</i> .	1.5	4.0	-2.5	6.25
<i>Panthera onca</i> (melanism).	6.5	7.0	-0.5	0.25

From left to right: species, animal component, and human component, rank of "x" value, rank of "y" value, difference, and squared difference



STUDY LIMITATIONS

The observation sessions and the application of environmental enrichments were carried out according to the schedule established for the daily management activities of the felids at the WMU. However, it is proposed that observations be conducted during nighttime or crepuscular hours (20:00 – 22:00), as animals show greater activity during this period. Furthermore, the lack of access to certain requested information, which remained confidential due to WMU restrictions, limited a more detailed assessment of the welfare status of the individuals.

CONCLUSIONS

This study described the behavior of eight wild felids kept in captivity and documented the behavioral response before and after an environmental enrichment implementation under routine management conditions. Individuals with behaviors indicative of behavioral compromise (stress) were identified, manifested mainly as repetitive pacing and persistent vocalization, as well as low expression of exploratory behaviors and interaction with the environment prior to the intervention. The results obtained suggest that the incorporation of physical and sensory stimuli within the enclosures is associated with changes in the behavioral expression of animals under human care. Quantitative estimation indicated that the general welfare level fell within a medium range, with variations associated with the persistence or reduction of stereotypies. Overall, the findings support the usefulness of systematic behavioral monitoring, accompanied by environmental enrichment strategies adapted to each species, as a tool for the management of captive felids. The continuity of this type of study can provide additional elements for strengthening management strategies aimed at promoting adequate animal welfare conditions in wildlife under human care.

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