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A Case Study From El-hamma Zoo Algiers

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بِسْمِ اللَّـهِ الرَّحْمَـٰنِ الرَّحِيمِ

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The abstract:

This study assesses the welfare of zoo animals at El-Hamma Zoo in Algiers. For the evaluation of animal welfare in this zoo, we followed the protocol proposed by Ward et al. (2020), which includes a series of 110 items to be assessed through interviews with zoo staff and based on in-situ observations. These 110 items are divided into 11 sections, which are: veterinary care, animal management in the zoo, evaluation of animal behavior and mental health, food and hygiene, animal monitoring records, enclosures and barriers, visitors and contact with animals, transport and translocation, health and safety, staff, and finally, other parameters. These elements are rated as acceptable, questionable for those that need improvement, unacceptable for those that must be implemented or radically reviewed, and not applicable for those that do not apply to the case study. Our findings show that the primary concern is the mental health and behavior of the animals, followed by general animal management, safety and health issues, veterinary treatment, and finally, the control of contact between visitors and animals.

The key words: Animal welfare, Zoo, Assessment, Visitors' experience, El-hamma Zoo, Algeries.

Le Résumé :

Cette étude évalue le bien-être des animaux du zoo d'El-Hamma à Alger. Pour l'évaluation du bien-être des animaux dans ce zoo, nous avons suivi le protocole proposé par Ward et al. (2020), qui comprend une série de 112 éléments à évaluer au moyen d'entretiens avec le personnel du zoo et sur la base d'observations in situ. Ces 112 items sont répartis en 11 sections qui sont : les soins vétérinaires, la gestion des animaux au zoo, l'évaluation du comportement et de la santé mentale des animaux, l'alimentation et l'hygiène, les dossiers de suivi des animaux, les enclos et barrières, les visiteurs et les contacts avec les animaux, le transport et la translocation. , la santé et la sécurité, le personnel et enfin d'autres paramètres. Ces éléments sont jugés acceptables, discutables pour ceux qui nécessitent des améliorations, inacceptables pour ceux qui doivent être mis en œuvre ou révisés de manière radicale, et non applicables pour ceux qui ne s'appliquent pas à l'étude de cas. Nos résultats montrent que la principale préoccupation est la santé mentale et le comportement des animaux, suivis par la gestion générale des animaux, les questions de sécurité et de santé, le traitement vétérinaire et enfin le contrôle des contacts entre les visiteurs et les animaux.

Les mots clés : Bien-être animal, Zoo, évaluation, Expérience des visiteurs, Zoo El-hamma, Alger

الملخص:

تقيم هذه الدراسة رفاهية حيوانات حديقة الحيوان في حديقة حيوانات الحامة في الجزائر العاصمة لتقييم رفاهية الحيوانات في حديقة الحيوان هذه، اتبعنا البروتوكول الذي اقترحه وارد وآخرون. (2020)، والذي يتضمن سلسلة من 112 عنصرًا سيتم تقييمها من خلال المقابلات مع موظفي حديقة الحيوان وبناءً على الملاحظات في الموقع. وتنقسم هذه البنود إل 112 إلى 11 قسمًا هي: الرعاية البيطرية، إدارة الحيوانات في حديقة الحيوان، تقييم سلوك الحيوان والصحة العقلية، الغذاء والنظافة، سجلات مراقبة الحيوانات، المحظورات والحواجز، الزوار والاتصال بالحيوانات، النقل والنقل. والصحة والسلامة والموظفين وأخيرًا المعلمات الأخرى. يتم تصنيف هذه العناصر على أنها مقبولة، ومشكوك فيها بالنسبة للعناصر التي تحتاج إلى تحسين، وغير مقبولة بالنسبة للعناصر التي يجب تنفيذها أو مراجعتها بشكل جذري، ولا تنطبق على العناصر التي لا تنطبق على دراسة الحالة. تظهر النتائج التي توصلنا إليها أن الاهتمام الرئيسي هو الصحة العقلية وسلوك الحيوانات، تليها الإدارة العامة للحيوانات، وقضايا السلامة والصحة، والعلاج البيطري، وأخيرا، السيطرة على الاتصال بين الزوار والحيوانات .

الكلمات المفتاحية: الرفق بالحيوان، حديقة الحيوان، التقييم، تجربة الزوار، حديقة الحيوان الحامة, الجزائر العاصمة.

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List of acronyms

AZA: the Association of Zoos and Aquariums

WAZA: the World Association of Zoos and Aquariums

ZAA:the Zoological Association of America.

SSPs:Species Survival Plans.

EAZA: The European Association of Zoos and Aquaria.

OIE: The World Organization of Animal Health.

IACUC: Institutional Animal Care and Use Committee.

DSV : The Direction des Services Vétérinaires.

LVRs :Laboratoires Vétérinaires Régionaux.

CRDZA : Centre de Recherches et de Développement de Zoo d'Alger.

PLZA : Parc Zoologique et de Loisirs d'Alger.

Introduction:

The evolution of the concept of zoo animal welfare has undergone significant transformations over the past century, reflecting broader changes in societal values, scientific understanding, and ethical considerations. Initially, zoos were primarily seen as sources of entertainment and education, with minimal attention given to the well-being of the animals. Exhibits were often small, barren, and designed to maximize human viewing pleasure rather than cater to the animals' needs (Kreger&Mench, 1995).

In the mid-20th century, the growing field of ethology began to influence zoo practices, highlighting the importance of naturalistic environments that allow animals to express their innate behaviors. This shift was paralleled by an increasing recognition of the cognitive and emotional capacities of animals, leading to more sophisticated approaches to animal care (Maple, 2007). The development of the Five Freedoms framework by the Brambell Committee in 1965, which outlines basic welfare standards such as freedom from hunger and thirst, discomfort, pain, injury or disease, fear and distress, and the freedom to express normal behavior, marked a significant milestone in the evolution of animal welfare (Webb, 2008).

More recently, the focus has expanded to include positive welfare states, emphasizing not just the absence of negative experiences but also the promotion of positive ones, such as opportunities for play, exploration, and social interactions (Mellor, 2016). This holistic approach is supported by advancements in environmental enrichment techniques and welfare assessment tools, enabling zoos to create more dynamic and stimulating habitats (Hosey, Melfi, & Pankhurst, 2013). Moreover, the rise of accreditation programs, such as those administered by the Association of Zoos and Aquariums (AZA), has established rigorous welfare standards that zoos must meet to be recognized as credible institutions (AZA, 2020).

The evolution of zoo animal welfare continues to be an ongoing process, driven by continual research, public awareness, and ethical considerations, ensuring that the well-being of animals remains a central priority in zoological institutions worldwide.

Zoo animal welfare in developing countries faces unique challenges due to limited resources, varying standards of care, and differing levels of public awareness and governmental support. Often, zoos in these regions struggle with inadequate funding, which impacts their ability to

provide proper nutrition, medical care, and enriched environments for the animals (Hosey, Melfi, & Pankhurst, 2013). Moreover, the lack of stringent regulations and oversight can result in substandard living conditions that fail to meet basic welfare requirements (Mazur & Clark, 2001). However, there are ongoing efforts to improve these conditions through international collaborations, training programs, and initiatives by global organizations such as the World Association of Zoos and Aquariums (WAZA), which aim to elevate welfare standards and promote best practices (Dick & Hines, 2011). These efforts are crucial in fostering a culture of animal welfare and ensuring that zoos in developing countries can better meet the physical and psychological needs of their animals.

The objective of our study: is to conduct an evaluation of the animal welfare conditions in the zoo using a recently developed auditing instrument, as well as administering a questionnaire to visitors to gather their perception of animal welfare issues and their assessment of the adherence to these conditions in the visited zoo. The intended results were: (1) to identify areas for improvement in animal welfare. (2) To assess visitors' perception of animal welfare issues. (3) To evaluate visitors' overall experience. And finally, to propose tangible elements for improving the conditions of animal captivity and enhancing visitors' experience.

Good animal welfare should be of the highest priority and should underpin all decisions and actions of a modern zoo. Poor animal welfare, or perception of such, is a significant risk for the operations and strategic objectives of zoos. Zoos must be able to not only demonstrate positive welfare states, but also communicate their welfare achievements eloquently to the wider public. Zoos with less-than-optimal welfare cannot expect to achieve good outcomes in conservation, visitor entertainment, engagement, communication, human behavior change, or stakeholder partnerships. Animal welfare assessments should be robust, objective, and science-based. The Five Domains model is well-suited to welfare assessment of zoo animals and focuses on four physical domains and a fifth mental domain, which reflects how the animal experiences its own life. All zoos should have processes in place to support good welfare outcomes, including regular and continuous use of a welfare monitoring program, to monitor and assess an individual’s welfare. Zoos also need the necessary infrastructure, capacity, documents, training, and accountability to support their welfare objectives. Regular self-evaluation of the zoo’s welfare program is an important component of a strong approach to animal welfare. Increasingly, animal

welfare forms an important part of zoo accreditation programs. Global, regional, and national zoo associations actively support and appraise the welfare operations of zoos. The World Association of Zoos and Aquariums (WAZA) has determined that by 2023 all WAZA national and regional associations must have an animal welfare evaluation process in place, and all institutional members must be compliant with this process.

1. Definitions:

zoos serve several important functions, contributing to education, research, conservation and entertainment. Here is a detailed look at the significance of zoos:

1.1 **Conservation**: Zoos play a crucial role in conservation efforts, especially for endangered species. Many zoos participate in breeding programs for endangered animals, known as captive breeding or ex-situ conservation. These programs help maintain genetic diversity and provide a safety net against extinction. Some zoos also engage in reintroduction programs, where captive-bred animals are released into their natural habitats to bolster wild populations.

1.2 **Education**: Zoos are valuable educational resources, offering opportunities for people of all ages to learn about wildlife, biodiversity, and conservation. Through exhibits, interpretive signage, guided tours, and educational programs, zoos help raise awareness about the importance of protecting natural habitats and the threats facing wildlife. They also facilitate firsthand experiences with animals, fostering a connection to nature and inspiring conservation action.

1.3 **Research**: Zoos support scientific research aimed at better understanding animal behavior, physiology, reproduction, and health. Research conducted in zoos contributes to broader scientific knowledge and informs conservation strategies both within and outside zoo settings. Zoos also collaborate with universities, research institutions, and conservation organizations to conduct joint research projects and share findings.

1.4 Species Survival Plans (SSPs): Many zoos participate in Species Survival Plans, coordinated breeding programs managed by regional and international zoo associations. SSPs prioritize genetic diversity and aim to maintain healthy captive populations of threatened and endangered species. By participating in SSPs, zoos contribute to the long-term survival of species facing extinction in the wild.

1.5 **Animal Welfare**: While debates exist about the welfare of animals in captivity, modern zoos strive to provide high standards of care for their animals. Accredited zoos adhere to strict guidelines and regulations concerning animal housing, nutrition, enrichment, veterinary care, and social interactions. Zoos invest in enrichment programs to ensure animals' physical and mental well-being, offering them opportunities to engage in natural behaviors and stimuli.

1.6 **Community Engagement**: Zoos serve as community hubs, bringing people together to connect with nature and each other. They offer recreational opportunities for families, school groups, and tourists, fostering a sense of wonder and appreciation for wildlife. Zoos often host special events, workshops, and outreach programs that engage visitors in conservation activities and encourage sustainable behavior.

1.7 **Economic Impact**: Zoos contribute to local economies through tourism, job creation, and revenue generation. They attract visitors from near and far, who spend money on admissions, concessions, merchandise, and nearby accommodations. Additionally, zoos often collaborate with local businesses and support conservation-related industries, contributing to economic growth and development.

2 Definition of well-being and associated concepts:

The definitions of "animal welfare" are very linked to the content that the authors attribute to it (Carenzi and Verga, 2009). Some refer to the concept of stress, associating it with the way in which the animal perceives or represents its own living environment. This perception is particularly influenced by taking into account the means available to the animal to adapt to its environment ("coping") (Broom and Johnson, 1993; Veissier and Boissy, 2007). Other definitions are based more specifically on the sensitive and conscious nature of animals and in particular their capacity to feel pain and more broadly emotions such as suffering, frustration or even pleasure (Duncan, 1993). This ability to feel emotions was highlighted very early on by the Brambell Report (HMSO 1965). Let us emphasize in this regard that the statement of the "Five Freedoms" in this same report and in its subsequent versions (FAWC, 1979, 2009; see 4.2) often serves, wrongly, as a definition of well-being, whereas it These are mainly the conditions required for well-being. Indeed, as with the concept of stress, animal well-being is both a mental and physical state: "Welfare is a state of complete mental and physical health, where the animal is in harmony with its environment" (Hughes, 1976). This definition mirrors that of human health given by the WHO (1946): "Health is a state of complete physical, mental and social well-being, and does not consist only of an absence of disease or infirmity."

2.1 **Definition of well-being** :An animal's well-being is the positive mental and physical state linked to the satisfaction of its physiological and behavioral needs, as well as its expectations. This state varies depending on the animal's perception of the situation. (Anses, 2018).

3 zoological organizations and accreditation:

Proposing collaborative research with zoos requires the submission of several protocols. In this section, we define the terms commonly used by zoological and accreditation organizations. Roadside zoos are often small for-profit establishments that may offer close contact with the animals they keep (Moore 2008). With the emergence of roadside zoos that often exploit captive animals and are not grounded in traditional zoo culture, there has been a rise in zoological and conservancy accreditation (Winders 2017). Accreditation at its core evaluates zoos on animal welfare guidelines and housing conditions. Many of the hundreds of zoos in the United States are accredited by various organizations such as the Association of Zoos and Aquariums (AZA) and the Zoological Association of America (ZAA). Of these institutions, there are a total of 238 zoos and aquariums that are accredited by the AZA (Gusset and Dick 2011). AZA accreditation is often costly, making it out of reach for zoos outside urban centers. Moreover, AZA does not dictate management style or day-to-day operations at every level that would be important to the researcher– zoo personnel relationship. AZA institutions also vary in their implementation of an Institutional Animal Care and Use Committee (IACUC) approval process, coauthor ship requirements for zoo staff involved in collaborations, and the level of input of keepers and veterinarians when making Comparison of the Zoo standards in Algeria and Internationally (EAZA, WAZA).

3.1 About WAZA:

Since 1935, the goal of the World Association of Zoos and Aquariums (WAZA) has been to guide, encourage and support the zoos, aquariums and like-minded organizations of the world in animal care and welfare, environmental education and global conservation.

WAZA is the global alliance of regional associations, national federations, zoos and aquariums, dedicated to the care and conservation of animals and their habitats around the world. The membership consists of nearly 400 leading institutions and organizations around the world, and this number continues to grow.

3.2 WAZA's work:

WAZA promotes cooperation between leading zoos, aquariums, national and regional associations, as well as with leading wildlife experts, academies, and universities. WAZA provides support for species conservation management and husbandry of animals in human care,

while encouraging the highest standards in member institutions. WAZA has formed partnerships with leading international conservation organizations, committing its members to tackle global issues such as the illegal wildlife trade, coral-reef restoration, marine litter, sustainable palm oil and climate change.

The European Association of Zoos and Aquaria (EAZA) is an organization for the European zoo and aquarium community that links over 340 member organization in 41 countries. EAZA membership is open to all zoos and aquaria across Europe that complies with EAZA's standards. The organization is administered and headquartered at NaturaArtisMagistra in Amsterdam, the Netherlands.

The World Association of Zoos and Aquariums (WAZA) is the "umbrella" organization for the world zoo and aquarium community. Its mission is to provide leadership and support for zoos, aquariums, and partner organizations of the world in animal care and welfare, conservation of biodiversity, environmental education and global sustainability.

4 Information about veterinary legislation in Algeria:

4.1 **Definition of Legislation**: legislation is the set of laws and regulations in force in a country or those related to a specific domain (e.g., labor, commerce, etc.). It includes the constitution, laws enacted by the legislative power, as well as decrees, ordinances, and circulars issued by the executive power

4.2 **Veterinary Legislation:** highlights the importance of veterinary legislation in ensuring the health and well-being of animals. It outlines the role of the veterinary services in Algeria, including surveillance, disease detection, and prevention

4.3 **International Organizations**: The document discusses the role of international organizations in veterinary legislation, particularly the World Organization of Animal Health (OIE). It explains the OIE's mission, structure, and activities, including disease surveillance, information dissemination, and standard-setting

4.4 **Organization of Veterinary Services in Algeria**: provides an overview of the organization of veterinary services in Algeria. It describes the structure of the Ministry of Agriculture and Rural Development, including the Direction des Services Vétérinaires (DSV), which is responsible for implementing and enforcing veterinary legislation.

4.5 **Law No. 88/08**: references Law No. 88/08 of January 26, 1988, which is the primary legislation governing veterinary medicine and animal health in Algeria. The law outlines the responsibilities of the DSV and the measures to be taken in case of animal diseases.

4.6 **Decrees and Regulations:** mentions several decrees and regulations related to veterinary legislation in Algeria, including Decree No. 95/363 and Decree No. 96/236. These decrees provide further details on the implementation of veterinary legislation and the measures to be taken in case of animal diseases

4.7 **Laboratories and Testing**: discusses the role of laboratories in veterinary legislation, particularly the Laboratoire Central Vétérinaired'Alger and the LaboratoiresVétérinairesRégionaux (LVRs). These laboratories are responsible for testing and diagnosing animal diseases, as well as ensuring the quality of animal products .

5 Algerianne national parks:

There were 19 animal parks in Algeria. Many have disappeared like those of Batna, Béchar, the National Research Center on Arid Zones (CRDZA) in BeniAbbès, BeniSaf, BouSaâda, Djelfa, Djemaâ (Biskra) or even that of Laghouat. Today only those of Tlemcen, Oran, Taza (Jijel), Sétif, Ghardaïa, Braptia in El Kala (El Tarf) and in Algiers that of Ben Aknoun (PLZA) and that of Hammaexist . Animal parks open to the public, because in the past the sovereigns of the

Maghreb maintained their own menageries for their pleasure and leisure, appeared under French colonization. They were more living collections of exotic fauna. With the exception of the Hamma zoo and the CRDZA zoo, none survived independence. Today, there are 8 of them, half of which are private, are the work of the HadjAïssa family from Ghardaïa. The other 4 are public, two are in Algiers, the largest, that of Ben Aknoun, has some vague resemblances to zoos elsewhere, and the smaller one of Hamma. Those that remain, the parks of Taza in Jijel and Braptia in El Kala, both managed by the PLZA, are the work of Ahmed Maâbed, wali of El Tarf after having been that of Jijel.

Algerian parks are all the result of improvisation. They are of different dimensions. The small ones, those in the private sector, are established on a few hundred square meters, a major advantage for their management which remains within the means of the managers. For the largest, there were no prior studies for the occupation of the space, selecting the groups of animals and sizing the infrastructures with well-defined objectives: menageries, collections of animals to be exhibited, or even in its modern design as a biodiversity conservation center. This type of establishment is budget intensive. In Europe, world-renowned zoos such as those of Antwerp (Belgium),Prague zoo (Czech republic), need, in addition to revenue from their millions of visitors, colossal subsidies from the State, of the region and the municipality. Associations and research laboratories must also come to the aid of activities that are no longer supported by public funds.

6 The reasons to carry out an Assessment:

Assessing a facility is an effective management technique that can identify significant opportunities for animal care, operational improvement, and cost savings. An assessment can be used:

- ✓ To obtain factual input for management decisions.
- ✓ To obtain unbiased management information.
- ✓ To know factually if the zoo (facility) is at risk.
- ✓ To identify areas of opportunity.
- ✓ To improve continuous communication and motivation.
- ✓ To assess individual performance based on facts.

- ✓ To assess the status and capability of infrastructure.
- ✓ To assist with training of all staff.

7 The key insights from the animal welfare risk assessment process for zoos include:

7.1 Prioritization of Welfare Interventions:

The process helps zoos prioritize areas for action and benchmark progress, ensuring that resources are allocated effectively to achieve the most productive results.

7.2 Benchmarking and Continuous Improvement:

The systematic analysis of welfare risks enables zoos to set and target institutional welfare goals, fostering a culture of continuous improvement and ensuring that animal needs are prioritized in decision-making.

7.3 Keeper Relationships and Husbandry:

The assessments highlight the importance of high-quality relationships between keepers and animals, which can positively impact animal welfare. This includes factors such as keeper interaction time and the ability to form bonds with animals.

7.4 Knowledge Gaps and Research Priorities:

The process identifies gaps in understanding animal behavior and welfare, leading to the development of research projects to address these gaps and improve welfare standards.

7.5 Environmental Factors and Sensory Environment:

The assessments emphasize the significance of environmental factors such as noise levels, light conditions, and visual stimuli in affecting animal welfare. This underscores the need for further research into the impact of sensory conditions on animals in zoo environment.

7.6 Use of Technology and Data Analysis:

The process incorporates technological tools, such as CCTV networks, to facilitate non-invasive monitoring and data collection, which can aid in identifying welfare risks and improving animal care.

7.7 Staff Training and Competency:

The importance of staff training and competency in identifying and reporting welfare risks is recognized, with the potential for future investigations into the effectiveness of such training.

8 Description of the region:

Beyond being a space for relaxation and recreation, the zoo serves as a conservatory of the wild world, a place where one becomes aware of the threats facing nature and the necessity to preserve it. EL-Hamma Zoo has committed itself to this path by prioritizing both the conservation of endangered animal species and the education and awareness of the public through various educational tools (signs, workshops, guided tours, brochures, film screenings, etc.).It aims to facilitate the development of scientific knowledge, particularly in the fields of behavior, reproduction, and veterinary medicine. It also seeks to assemble a diverse collection of animal species through the creation of a wildlife museum.

Figure a: the entrance of the El-Hamma zoo

8.1 Location of El-Hamma zoo in Algiers:

Located in The El- Hamma garden in the Belouizdad district of Algiers, is a lush garden, which extends like an amphitheater, at the foot of the National Museum of Fine Arts, from Mohamed-Belouizdad street to Hassiba- Ben-Bouali street its geographic coordinates are 36° 44′ 53″north, 3° 04′ 34″ east, over an area of 32 hectares3.At the northern end of the alley of the dragon trees is the zoological garden which brings together specimens of North African fauna and some wild animals.

Figure b:geographical map of Algeria

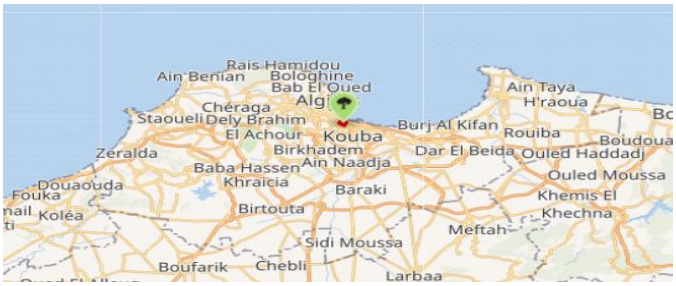

Figure c: geographical map of Algeries

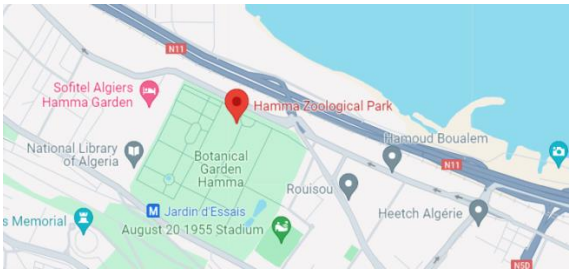

Figure d: Location of El-Hamma zoo in Algiers

8.2 General info about El-Hamma zoo:

The creation of the Zoological Park of Hamma dates back to the year 1900 under the leadership of Mr. Joseph D'Ange. At that time, it was the only zoological garden in North Africa.

It played a relay role between the major establishments in France and the center of Africa, facilitating the transit of a large number of animal species to populate the numerous animal parks and menageries of the time.

The Zoological Garden is located near the North gate of the experimental garden. It covers an area of one hectare. The floristic richness and diversity of the experimental garden, along with its proximity to the sea and high humidity, create an exceptional, possibly unique, tropical climate in North Africa.

8.3 Inhabitants of the zoological garden:

At its inception, the first residents of the zoo were ostriches, wild boars, and a few monkeys. Over the years, it has significantly enriched itself with a multitude of exotic animals.

At the entrance, a large pond houses a crowd of birds such as flamingos, geese, Mandarin ducks, and peafowl. Not far away, fish swim in a cascade adorned with rocks and plants, with the water jet supplied by spring water.

The wild animal enclosure features an imposing Bengal tiger, a very agile and skillful leopard, and the majestic king lion... undoubtedly the primary attraction for visitors both young and old.

A variety of birds in a riot of colors... large blue macaws, Amazon parrots, cockatoos, occupy a large aviary and face magnificent exotic birds such as parakeets, lovebirds, and kakarikis. Indigenous species can also be admired... Fennec foxes, Barbary sheep, and endangered gazelles.

Many other curious and impressive animals (alligators, brown bears, ostriches, various birds of prey...) will make you want to come back and visit this little Noah's Ark.

The presentation of animals in environments evoking their original ecosystems, respect for their well-being and the immersion of the visitor guided the architectural and landscape designs of the Paris zoological park. Mammals, birds, reptiles, amphibians, fish and invertebrates: around 76 species and around 719 animals offer you a real world tour of animal biodiversity.

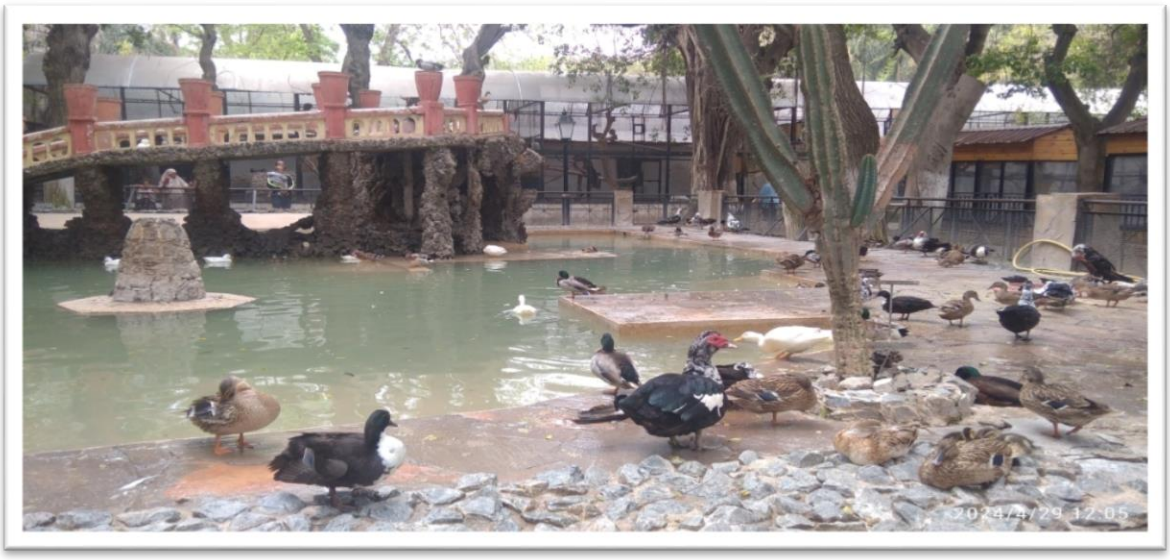

Figure e: A small pond at the entrance with a verity of birds but mostly ducks.

Figure f: the lions ` cage

Figure g: the flamingo`s enclosure

Methods:

1 Zoo animal welfare assessment

For the evaluation of animal welfare in the visited zoo, we followed the protocol proposed by Ward et al. (2020), which includes a series of 112 items to be assessed through interviews with zoo staff and based on in-situ observations. These 112 items are divided into 11 sections, which are: veterinary care, animal management in the zoo, evaluation of animal behavior and mental health, food and hygiene, animal monitoring records, enclosures and barriers, visitors and contact with animals, transport and translocation, health and safety, staff, and finally, other parameters. These elements are rated as acceptable, questionable for those that need improvement, unacceptable for those that must be implemented or radically reviewed, and not applicable for those that do not apply to the case study.

Once the evaluation is completed, it highlights all the elements that need to be reviewed through a matrix, allowing for the development of an upgrade strategy.

2 Zoo visitors survey

We also conducted a survey among zoo visitors, focusing on their perception of the importance of animal welfare in zoos and their assessment of the welfare conditions in the visited zoo. Subsequently, we compared the results of this survey with the evaluation conducted with the staff to identify any correlations. Additionally, we used this survey to ask questions that would allow us to evaluate the visitors' overall experience, with the aim of formulating practical recommendations for improving their experience.

3 Statistical analysis

Descriptive statistical analyses were conducted using Microsoft Excel

A/ Visitors survey results

The survey was conducted among visitors of El Hamma garden in Algiers. The objective of this survey was to gather information about their experience and identify visitors' perception of animal welfare for improvement. The survey was conducted from the 29th of April to the 2nd of May and 100 responses were collected.

1-Respondent profile

Of the 100 people interviewed, 56 were women and 44 were men, belonging to age groups ranging from under 18 to over 65,with the majority of respondents belonging to the 25-34 and 35-44 age groups as shown in Figures 1 (a,b). For the purposes of this study we firstly targeted adult respondent (age over 18 year) and only 12 parents gave their consent for their children participation.

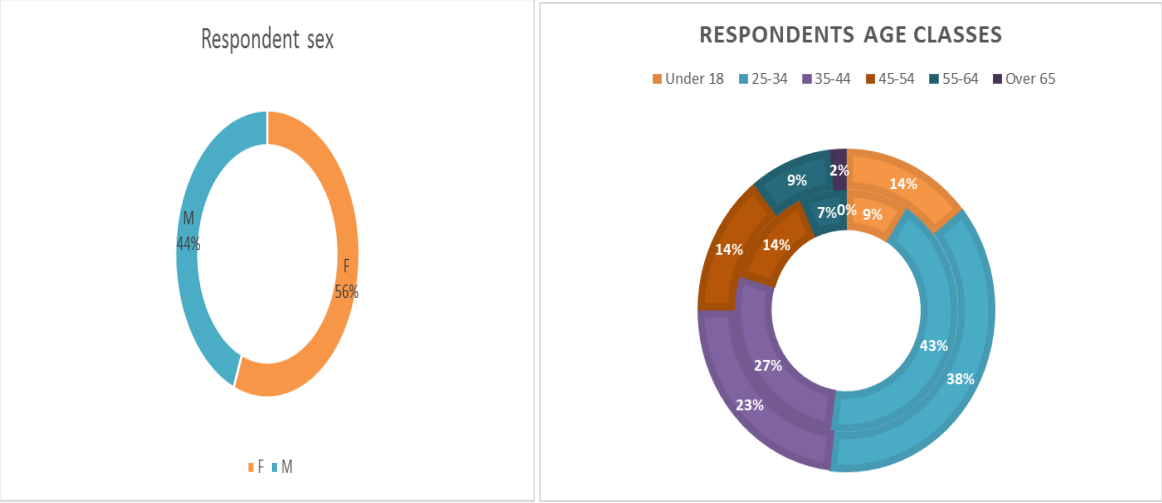

Figure h:1. Distribution of respondents by gender. 2. Distribution of respondents by gender and age group (the inner circle represents men and the outer circle represents women).

2-Frequency of visit:

The results shows that both males and females visit the garden rarely or occasionally (Fig.2), and only few of them declare visiting the garden and the zoo regularly

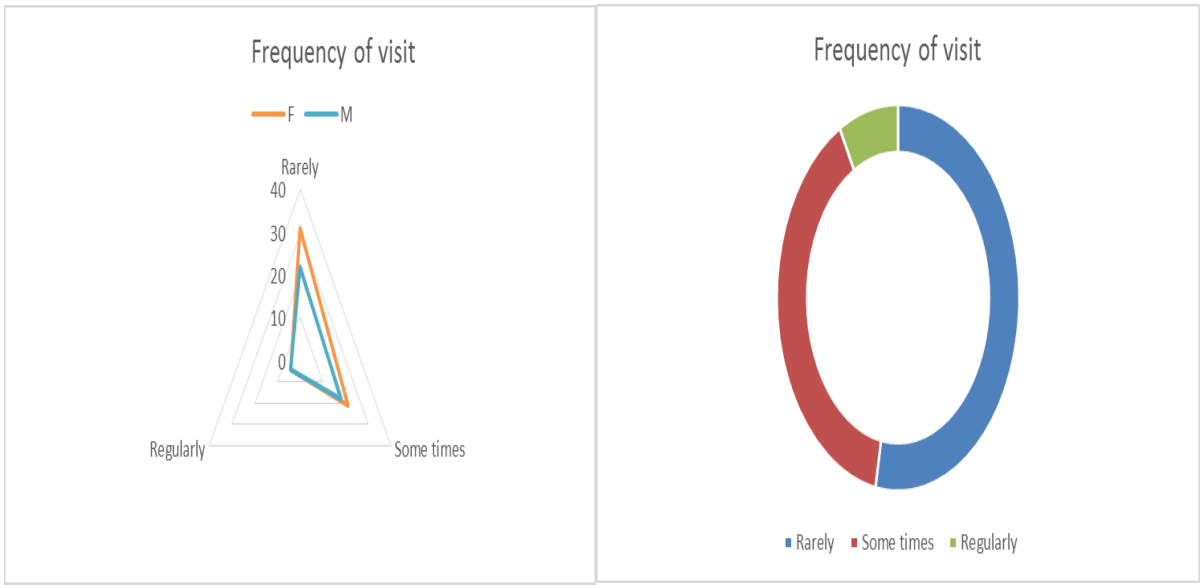

Figure i:Frequency of visit.

3-Reason of the visit:

The majority of the respondents declare visiting the garden for recreation and for family visit with their children as noted in figure.3

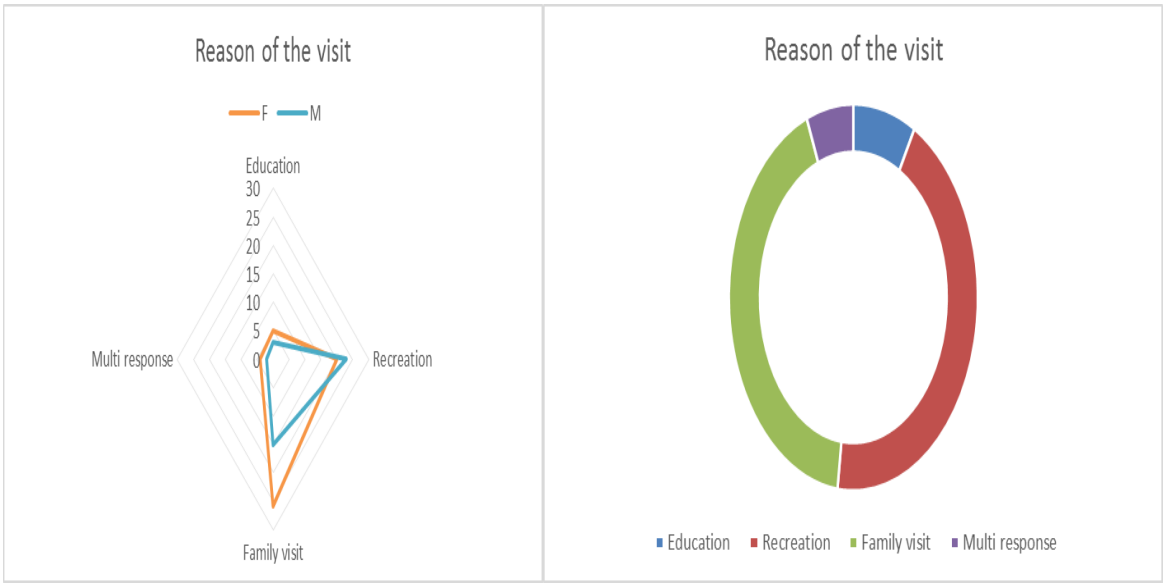

Figure j:reasons of visit

4-Satisfaction of zoo animals' diversity:

The visitors seems to be satisfied of the variety of taxa at the zoo, however the responses shows a disparity of choice between males and females. The first categories seem to be less satisfied than the second (Fig.4).

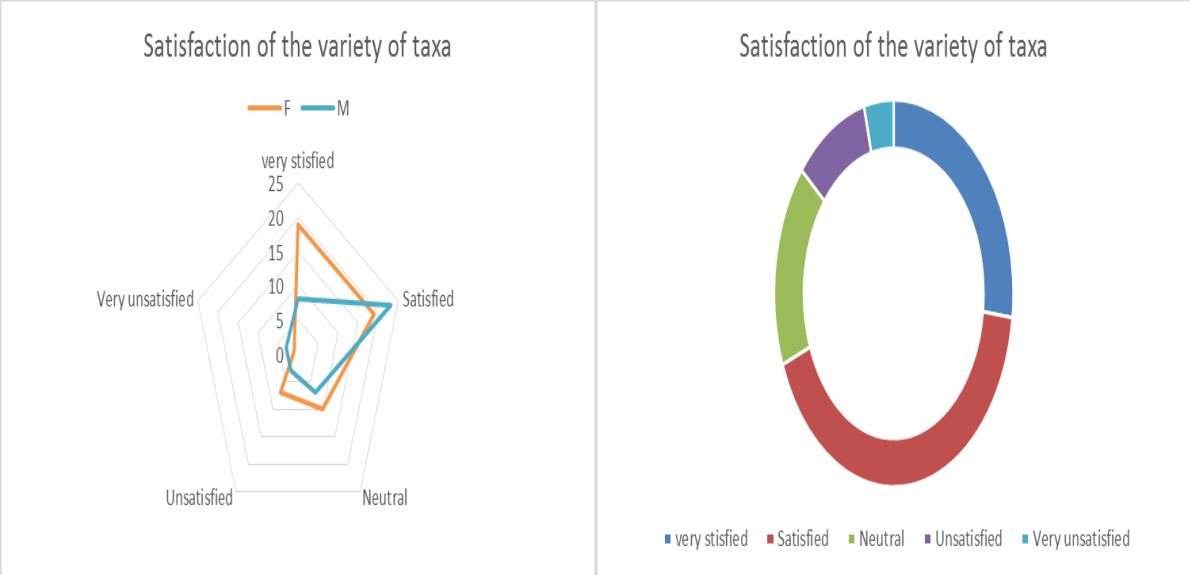

Figure k:Visitors' satisfaction of zoo animals' diversity

5-Evaluation of the most interesting taxa present in the zoo:

Our results indicate a clear preference among women for birds. On the other hand, men show a preference for felines.

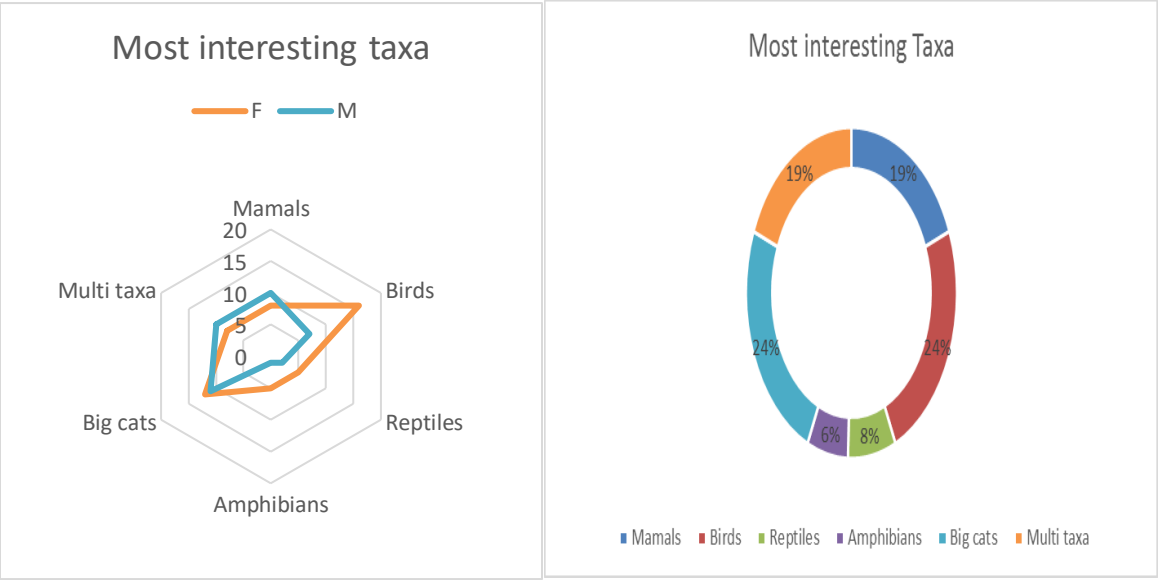

Figure l: Evaluation of the most interesting taxa present in the zoo

6-Perception of animal wellbeing importance in Zoos

The results shows that animal wellbeing is very important in zoos, with no difference in answers between males and females (Fig.5).

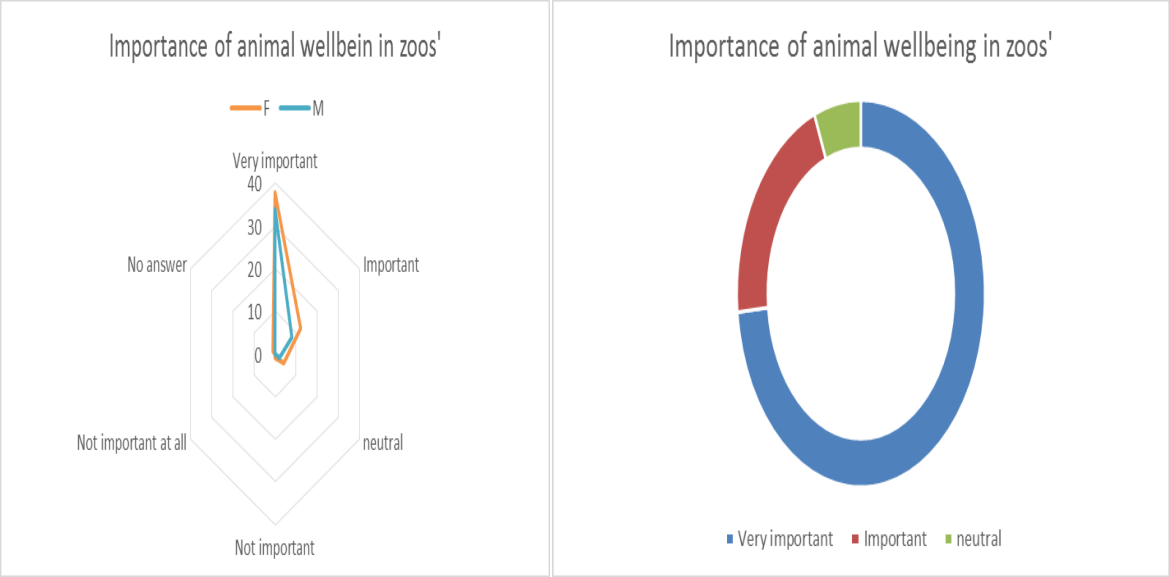

Figure m:Perception of animal wellbeing importance in Zoos

7-Visitors' perception of the work of the zoo regarding animal wellbeing

Most of respondent agree with the postulate that the zoo do a good job to ensure good welfare condition fir the animals (Fig.6).

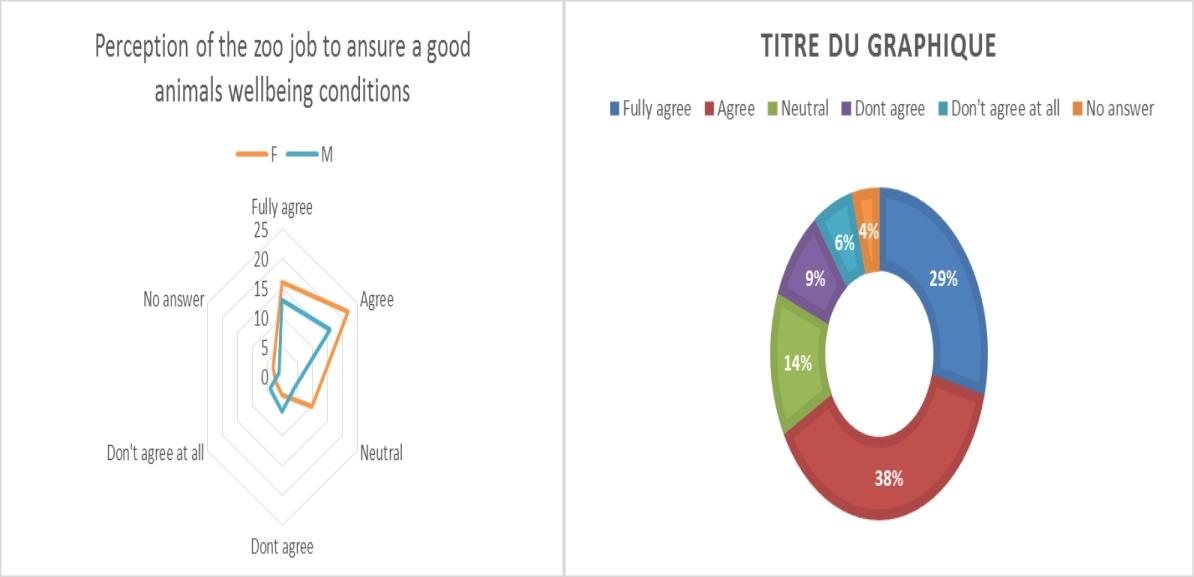

Figure n:Visitors' perception of the work of the zoo regarding animal wellbeing

8-Suggestions for improvement

The survey results indicate that the majority of visitors believe it is necessary to provide more space for animals that seem cramped in their enclosures, especially concerning the felines. Another frequently mentioned remark is the importance of installing certain facilities such as toilets and food stores. Other pertinent comments point out the lack of guided tours, activities inside the park and zoo, and a lack of information about the animals kept in the zoo (Fig.8).

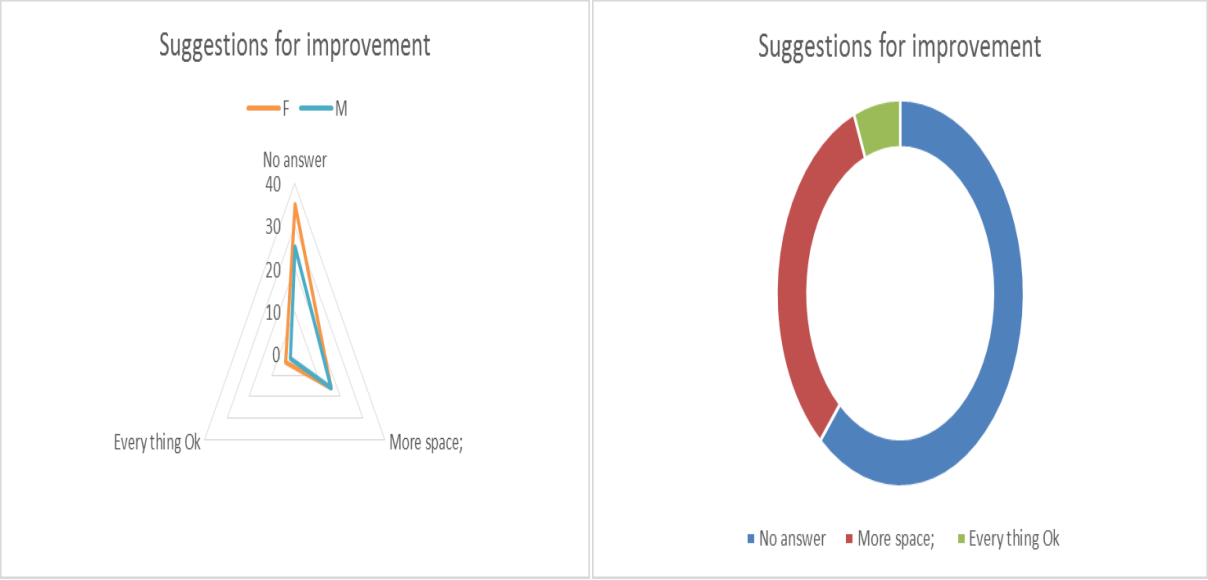

Figure o:Suggestions for improvement

9-Evaluation of the educational information provided

Both the men and women surveyed believe that the educational information about the animals kept in captivity at the zoo is generally of good quality and satisfactory (Fig.9).

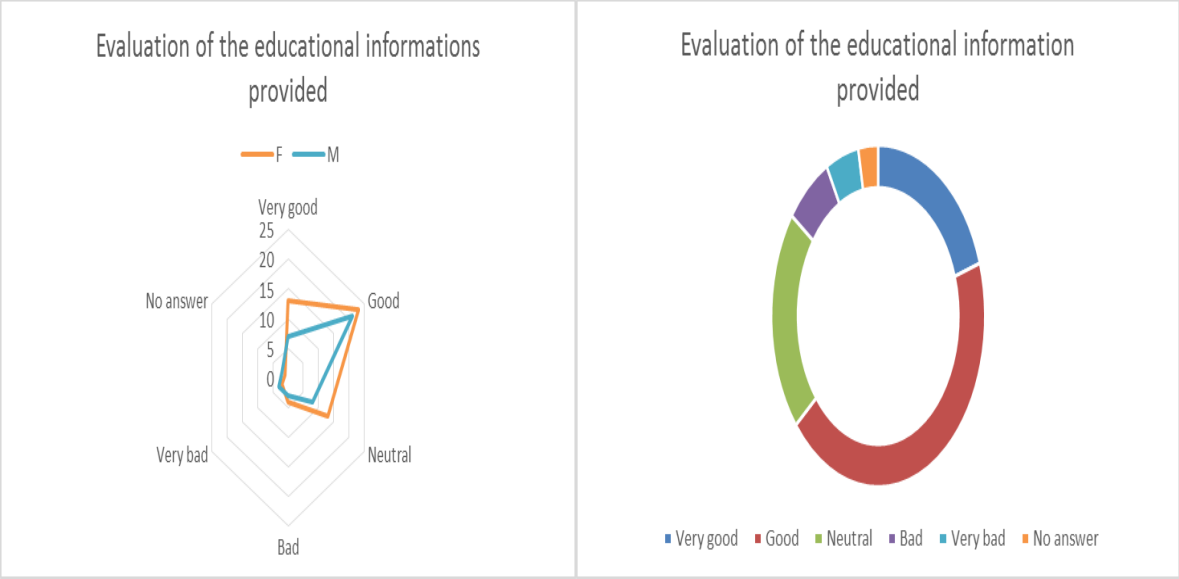

Figure p:Evaluation of the educational information provided

10-Knowledge improvement after the visit

The visitors who responded to this question indicate a tendency to have learned things about the animals presented at the zoo. This tendency is more pronounced among women than among men (Fig.10).

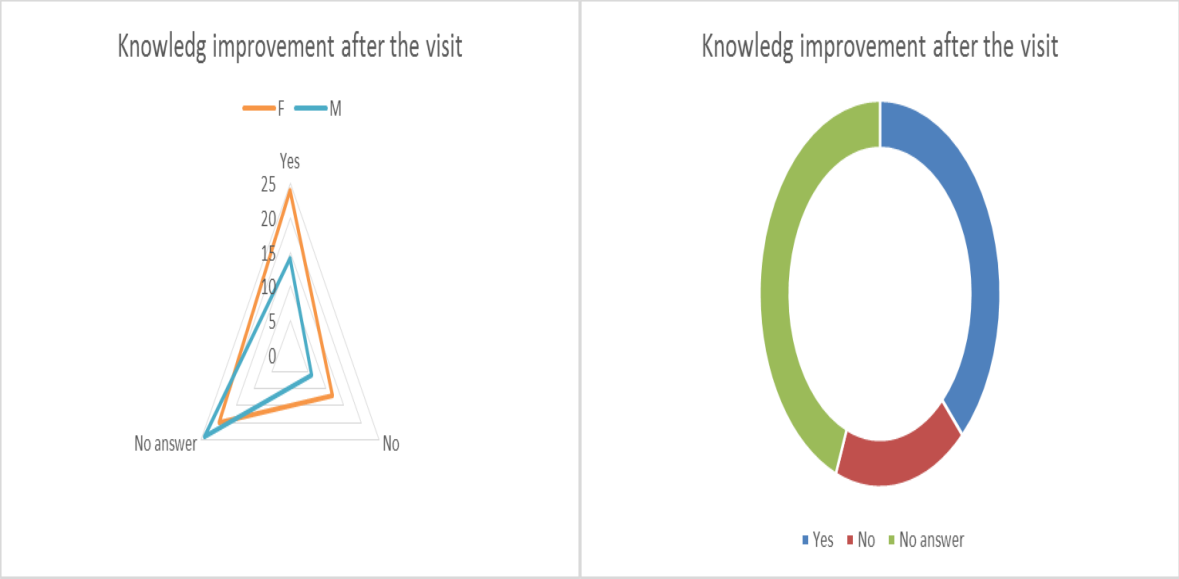

Figure q:Evaluation of the improvement of the knowledge about the animals after the visit

11-Evaluation of the entry prices

The overall appreciation of the entry prices by visitors indicates that they consider them to be very reasonable, with a small proportion of them believing that the prices are very low (Fig.11).

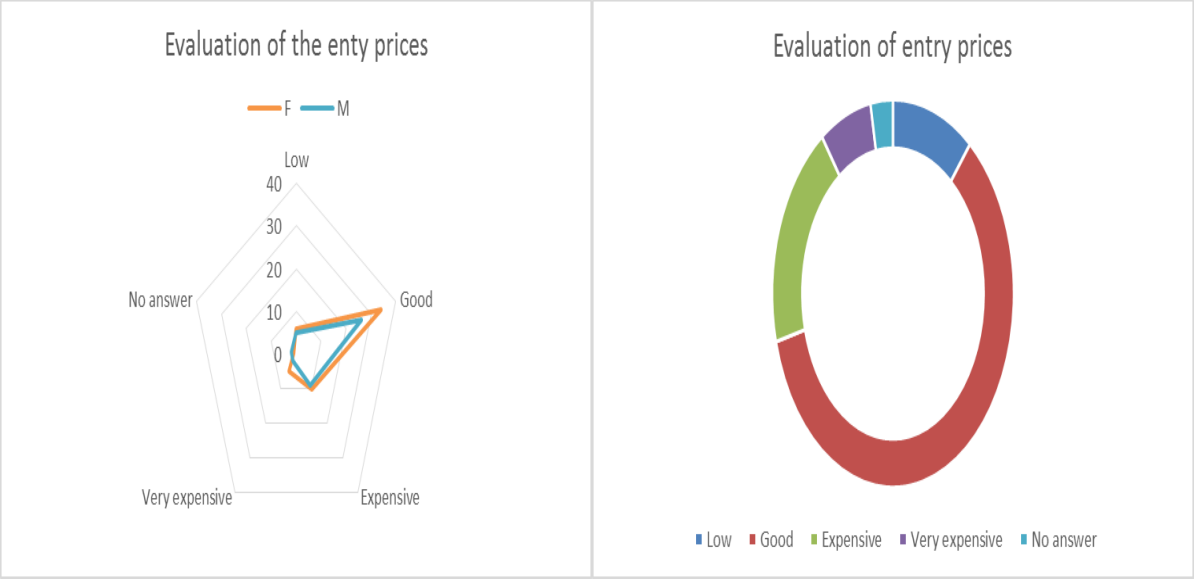

Figure r: Evaluation of the entry prices.

12-Willfulness' to revisit the zoo in the case of absence of felids

As highlighted in figure.12, the majority of respondent agree to revisit the zoo even if felids are absent, with some of them being more nuanced about this option.

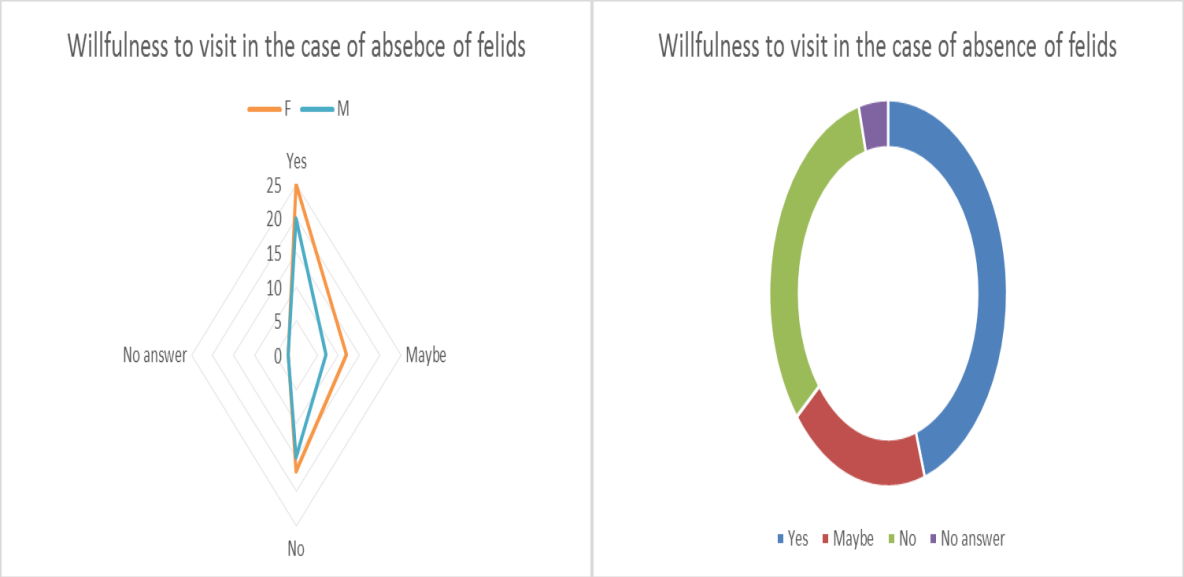

Figure s: Willfulness' to revisit the zoo in the case of absence of felids

13-Overall satisfaction

Most of respondent declare being very satisfied with the overall experience provided by visiting the zoo and the garden (Fig.13).

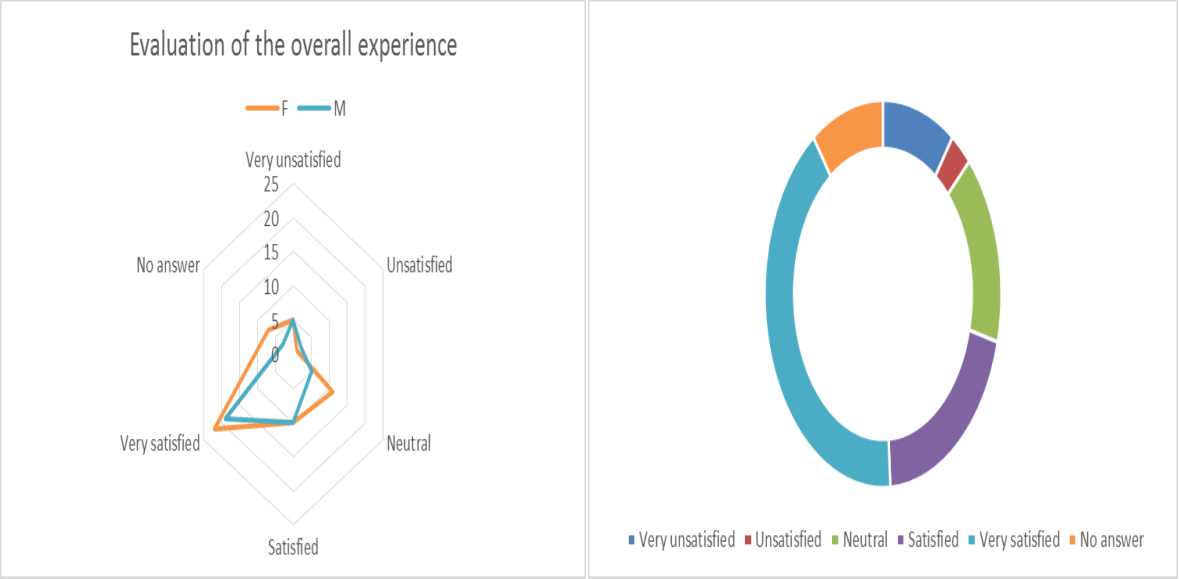

Figure t: Visitors rating of the overall experience in the zoo

B/ 1-**Veterinary care assessment**

The part concerning veterinary care for animals in the zoo comprises 26 questions. The evaluation of these various parameters indicates that 13 elements (50%) of these practices are questionable and merit review for improvement, notably... (Table.1).

Table 1:1 Veterinary care assessment.

	Veterinary Care	**A**	**Q**	**UA**	**Nap**	**Nass**
1	Is the animal collection under the supervision of a veterinarian?	A				
2	Does the level of veterinary supervision and care provided appear to be adequate for the size of the institution and number of animals accommodated?	A				
3	Is there clear effective communication between the veterinarian and the institution's animal care team?	A				
4	Is the response time between noticing/reporting an animal health problem and the receipt of appropriate veterinary care adequate?	A				
5	Is the veterinary examination/treatment room adequate and does it have suitable facilities to meet the needs of the collection?	A				
6	Is there proper, secure management of all veterinary medicines?	A				
7	Are the quarantine facilities and quarantine protocols appropriate?		Q			
8	Are the biosecurity measures in place sufficient and suitable?	A				
9	Do the animals appear to be in good health, with no obvious signs or injury or illness?		Q			
10	Do mutilation procedures appear to have been carried out on any of the animals?	A	Q			

11	Is the frequency of visual inspection of the animals by keeper staff suitable and the protocol for reporting health concerns effective?	A				
12	Are keeper observations of general animal health and Behavior recorded?	A				
13	Is the frequency of routine clinical examinations for all of the animals appropriate?	A				
14	Is there a suitable preventative medicine programmed in place?	A				
15	Does the facility normally perform necropsies?		Q			
16	Are suitable samples from necropsies submitted for pathological analysis?		Q			
17	Is the area where necropsies are performed suitable?		Q			
18	Are deceased animals stored away from food and disposed of appropriately?		Q			
19	Is there a safe and effective programme for the control of pests and where necessary, predators?		Q			
20	Is there well maintained and appropriate animal capture equipment available on site, along with a sufficient number of trained staff to use it?		Q			
21	Does the facility maintain up-to-date veterinary records on the health of individual animals within the collection?	A	Q			
22	Does a review of clinical records, animal health management and disease issues take place?		Q			
23	Are there written protocols for the euthanasia of animals?		Q			
24	Is euthanasia carried out under veterinary supervision, or by a competent, senior staff member properly trained and experienced in the techniques used, who has access to the necessary equipment and facilities and		Q			

	who is available at all times?					
25	Are the circumstances mandating euthanasia or humane killing appropriate?		Q			
26	Is there any form of ethical review or oversight?		Q			

2-Animal management assessment

The interview with zoo managers and veterinarians indicates 15 (68.18%), management elements that are considered questionable or unacceptable and require urgent correction, notably, maintaining social animals in groups to allow them to interact with their nonspecific's, prevention against parasites, as well as improving the quality of substrates on which animals evolve to allow them to express their natural behavior to the fullest (Table.2)

Table:2 Animal management assessment.

	Animal Management	**A**	**Q**	**UA**	**Nap**	**Nass**
27	Do the majority of the enclosures appear to be clean and well maintained?	A				
28	Where appropriate, are the animals maintained in social groups of suitable composition (eg number, age and sex ratio)?			UA		
29	Are there any naturally social species currently housed in enclosures on their own?		Q			
30	Does management practice ensure that undue dominance by individuals is avoided?		Q			
31	Does management practice ensure that persistent and unresolved conflict is avoided?		Q			
32	Does management practice ensure that physical carrying capacity is not		Q			

	overburdened?					
33	Is the total number of animals accommodated appropriate for the area of land occupied by the institution and the available resources?		Q			
34	Does management practice ensure that an uncontrolled build-up of parasites and other pathogens is prevented?			UA		
35	Is separate accommodation provided where appropriate for pregnant mothers and animals with young?		Q			
36	Are animals kept in temporary accommodation? If yes, is their situation regularly and appropriately assessed?		Q			
37	Do the majority of enclosure environments provide for the well-being of the animals throughout the year?			UA		
38	Are the environmental temperature and humidity levels maintained appropriately for the animals?		Q			
39	Is there adequate ventilation and appropriate lighting in indoor areas and holding areas?	A				
40	Are any of the enclosures located where there is loud or excessive noise?	A				
41	Are the majority of the enclosure substrates, design features and furniture sufficient to provide enough shelter and refuge for all			UA		
	specimens displayed, including those kept in multi-species exhibits?		Q			
42	Are the majority of the enclosure substrates, design features and furniture sufficient to provide for the Behavioral needs of all individuals displayed, including those kept in multi-species		Q			

	exhibits?					
43	Is the drainage of the majority of enclosures safe, efficient and appropriate?	A				
44	In aquatic enclosures are appropriate water quality parameters measured and controlled?		Q			
45	Is the equipment (including back up facilities) that is necessary to ensure correct enclosure environmental provision well maintained?	A				
46	Can personnel service all enclosures in a manner that is both safe to themselves and the inhabitants?	A				
47	If there are free ranging animals on site (eg peacocks, guinea fowl), are they monitored and is there a documented husbandry and management protocol for their care?	A				

3-Behavior and mental health assessment

The majority of points regarding the mental health of animals 80% seem questionable and merit thorough reflection aimed at improving the conditions of detention for these animals (Table.3).

Table 1:3 Behavior and mental health assessment:

	Behavior& Mental Health	**A**	**Q**	**UA**	**Nap**	**Nass**
48	Do indoor, outdoor and holding enclosure areas all allow for normal Behavior patterns and ranges of movements to be expressed?		Q			
49	Is environmental enrichment regularly provided?		Q			
50	Are the animals generally bright, alert and interested and engaged in their surroundings?					

51	Are positive animal Behaviors (eg play, exploration, rest, normal feeding, etc) observed?		Q			
52	Are negative animal Behaviors (eg over- grooming, avoidance, stereotyping, hyper- aggression, apathy, etc) observed?		Q			
53	Are any of the animals restrained or tethered at any time?	A				

4-Food and food hygiene assessment

In this section, some elements such as the underweight condition of certain animals, the use of dietary supplements, and the use of live vertebrates to feed the animals deserve to be reviewed.

Table 1 8:4 Food and food hygiene assessment.

	Food and foodhygiene	**A**	**Q**	**UA**	**Nap**	**Nass**
54	Are the animals generally in good body condition?	A				
55	Are there any animals that are underweight?		Q			
56	Are there any animals that are overweight?	A				
57	Do all animals have ready access to plenty of clean, potable water?	A				
58	Is food sourced from a reputable supplier, ensuring that it is free from any contaminants?	A				
59	Is the quality of animal foodstuffs adequate and acceptable?	A				
60	Is the quantity of food provided for the animals documented, adequate and the consumption thereof, monitored?.	A				
61	Does the provided food meet the specific nutritional requirements of each species and of each individual?	A				
62	Is dietary supplementation given?	A				
63	Are supplies of food and drink prepared under hygienic conditions?	A				

64	Is food stored correctly to protect it from damp, deterioration and contamination by pests?	A				
65	Are perishable foods kept refrigerated?	A				
66	Is the manner of feeding safe for both the animals and the staff?	A				
67	Are there enough food and drinking sites so as to be accessible to every animal within a particular enclosure?	A				
68	Are food and drink provided in such a way that they meet the biological and Behavioral needs of the animal?	A				
69	Are feeding enrichment techniques used?		Q			
70	Are the diets of the animals reviewed regularly?	A				
71	Are there feeding protocols in place should hand rearing be necessary?	A				
72	Are live vertebrate animals offered as food to any animal?		Q			

5-Animal records assessment

The animal registry appears to be well maintained, and no evaluation element needs to be revised (Table.5).

Table 8:5Animal records assessment.

	Animal Records	**A**	**Q**	**UA**	**Nap**	**Nass**
73	Are up to date records (including husbandry details, daily Behavioral observations, etc) held for all individual animals?	A				
74	Is the system of recording information easy to search, secure and fit for purpose?	A				

75	Does the facility have any form of collection plan?	A				
76	Can all of the animals held at the institution be individually identified? If so, what methods of individual animal identification are used?	A				

6-Enclosures and barriers assessment.

All evaluation points in this section seem satisfactory except for one concerning certain enclosures where the barriers do not appear adequate and can lead to direct contact with the animals, posing risks to both visitors and the animals (Table.6).

Table 8:6Enclosures and barriers assessment

	Enclosures &Barriers	**A**	**Q**	**UA**	**Nap**	**Nass**
77	Are the enclosures and barriers designed, constructed and in such a condition to safely contain animals within the desired enclosures?	A				
78	Are the enclosures free from vegetation or other items that would aid animal escape?	A				
79	Are gates/doors to enclosures containing hazardous animals securely locked at all times?	A				
80	Do gates/doors to enclosures appear to be as strong and effective in containing the animals as the rest of the enclosure barrier?	A				
81	Where appropriate, are adequate standoff barriers provided to prevent direct contact between visitors and enclosures?		Q			

7-Visitors, animal contact and training assessment

Many elements of this section are not applicable to the El Hamma zoo since all animals are kept inside enclosures, and 30% of them are questionable. However, one point that deserves correction is adopting effective measures to prevent visitors from feeding the animals (Table.7).

Table 8:7Visitors, animal contact and training assessment.

	Visitors, Animal Contact & Training	**A**	**Q**	**UA**	**Nap**	**Nass**
82	Are the animals welfare needs appropriately managed with due regard to the requirements of the viewing public?	A				
83	Does the unregulated feeding of the animals by visitors take place?		Q			
84	Is the regulated feeding of specific animals by visitors permitted? If so, under what specific circumstances is it allowed and how is it supervised, controlled and managed?	A				
85	Does the facility have animal demonstrations, shows and/or animal rides or undertake any form of animal contact?				NAP	
86	Are animals ever involved in animal contact situations off-site?		Q			
87	Are animals handled only by or under the supervision of authorized personnel?		Q			
88	Does the handling of animals by personnel appear to be consistent with the animal's welfare?					
89	If there are any animal-training programs in place at the institution, are they documented and appropriate in technique, duration and purpose?				NAP	
90	Are appropriate barriers used to assist with training?				NAP	
91	Is physical punishment of the animals ever used?				NAP	

92	Is there regular monitoring and review of animal contact and training programs?				NAP	

8-Transactions and transport assessment

Given the absence of animal exchanges between different zoos in the country or with zoos abroad, the evaluation elements in this section are satisfactory (Table.8).

Table 8:8Transactions and transport assessment.

	Transactions and Transport	**A**	**Q**	**UA**	**Nap**	**Nass**
93	Are there facilities for crating and transporting animals?	A				
94	Are routine veterinary examinations performed prior to transport?	A				
95	Is quarantine implemented on arrival of acquisitions?	A				
96	Is animal population management regularly reviewed?	A				
97	Are acquisition and disposition activities legal and ethical?	A				
98	Are there records kept of the movement of animals into and out of the institution?	A				

9-Health and safety assessment

In this section, 60% of the assessment items need to be adjusted. The unacceptable elements identified concern the absence of emergency protocols in case of animal escapes, as well as guides for managing potentially dangerous animals (Table.9).

Table 8:9 Health and safety assessment.

	Health & Safety	**A**	**Q**	**UA**	**Nap**	**Nass**
99	Are there procedures and equipment in place in the event of a dangerous animal escape?	A				
100	Are the emergency protocols practiced and if so, how often?			UA		
101	Are records kept in the event of an animal escape/attack?			UA		
102	Do staff receive training in animal health, disinfection principles and hygiene practices?	A				
103	Does the facility have clear procedures for working with hazardous animals?			UA		

10-Other concern assessment

Our results indicate that the evaluation elements in this section are satisfactory (Table.10).

Table 8:10 Other concern assessment.

	Other	**A**	**Q**	**UA**	**Nap**	**Nass**
104	Are there adequate provisions for the proper storage and disposal of animal waste?	A				
105	Does the facility have continuing financial support?	A				
106	Does the total financial support appear to be adequate to meet the needs of the facility?	A				

11-Personnel assessment.

Our results indicate that the evaluation elements in this section are satisfactory (Table.11).

Table 8:11 Personnel assessment.

	Personnel	**A**	**Q**	**UA**	**Nap**	**Nass**
107	Is the staff adequately directed?	A				
108	Is the staffing level appropriate to provide the required standards of animal husbandry and care?	A				
109	Do staff members regularly meet to discuss problems and possible solutions?	A				
110	In general do there appear to be good working relations in the zoos?	A				
111	Are animal care staff up to date with developments in their field of expertise?	A				
112	Is there provision for staff training and further development?	A				

Discussion:

1. Visitors' survey:

Sociodemographic elements of the survey indicate that, the age group of people visiting the zoo during the study period was between 24 and 44 years old. This group also predominantly reported that they rarely visit the zoo, suggesting that they are tourists passing through on their vacation.

The main reasons cited by visitors are recreational purposes or family visits, where parents accompany their children for leisure outings. Several studies have demonstrated the ability of zoos to spark public curiosity and their educational potential, especially for children (Clayton et al., 2009; Wagoner and Jensen. 2010; Jensen, 2014; Collins et al., 2020), despite the controversies these establishments may provoke. On the other hand, Jensen (2014) highlighted the limitations of unguided visits in achieving the expected educational goals. This brings us to another point in our findings, which are the visitors' reports of the absence of guided tours and their recommendation for the implementation of guides in the zoo.

Our results indicate that the most interesting taxa from visitors' perspective are big cats, which is in line with the findings of Care. N. (2016a,b)) who described that large mammals are the most wish to see animals among the UK zoo visitors. However in our case study birds arrive in the second position and they are the most wonted to see animals among the feminine part of zoo visitors. These results seem to be of the greatest importance, especially in terms of identifying potential flagship species within a particular cultural context (Bowen and Entwistle, 2002). Indeed, several studies have shown the popularity of birds as pets in Algeria (Khelifa et al. 2017; Bergin et al. 2019; Razkallah et al. 2019; Atoussi et al. 2020, 2022) and the disastrous effects this popularity has had on wild populations due to poaching. This underscores the potential role that zoos in Algeria can play if they are associated with conservation programs for local or even exotic birds. On the other hand, the responses to the question of visitors' willingness to revisit the zoo if the felines were no longer present were more mixed. This implies the need to carefully consider the zoo's development strategy. Given its age, the infrastructure it has is no longer suitable for current animal welfare standards, especially in terms of space and habitat enrichment.

The interviewed visitors mostly agree on the importance of animal welfare in zoos and that it is imperative to offer animals optimal living conditions, highlighting their sensitivity to this issue. Regarding their evaluation of the zoo's efforts to ensure animal welfare, the majority of visitors believe that the zoo is doing a good job, that the enclosures are clean, and that the animals seem to be in good health. However, most of the interviewed individuals insist that the enclosures are too small and emphasize the need to provide more space for the animals so that they can express natural Behaviours.

2. Zoo animal welfare assessment:

For the evaluation of animal welfare, we used the tool Wild Welfare "WW" developed by Ward et al. 2020, which is designed to audit zoos with the aim of providing recommendations to improve the conditions of animal detention. The audit comprises 112 questions relating to (i) nutritional provision (nutrition), (ii) the environment in which the animals are housed (environment), (iii) animal health, (iv) animal Behaviour (Behaviour), (v) the perceived mental state of the animals (mental health), (vi) the standard of animal record keeping (record keeping), (vii) sta_ health and safety (health and safety), (viii) information relating to the personnel working at the zoo (personnel) and (ix) other (containing questions pertaining to financial support and waste disposal).

Our results indicate that the major concern is the mental health and Behaviour of the animals, followed by general animal management, issues related to safety and health, veterinary care, and finally, the management of contact between visitors and animals. These results are similar to those of Ward et al. 2020, who used the same protocol for the evaluation of zoo animal welfare in zoos in developing courtiers'.

The most striking element was the narrowness of the enclosures, particularly for the felines. The second element was the confinement of social animals in individual enclosures. These factors do not contribute to the expression of natural Behaviours in the animals, which negatively affects their Behaviour and mental health. Indeed, several studies have shown the relationship between the size and complexity of the habitats provided in enclosures and the Behaviour of species,

where positive effects were observed on activity, reproductive success, and mental health of animals depending on the quality of the enclosures (De Azevedo et al. 2023; Scott et al. 2023).This narrowness of the enclosures, which have concrete floors, is characteristic of 20th-century menageries, where zoos aimed to present animals as a form of exotic entertainment for the public, rather than to contribute to increasing their knowledge and raising awareness about biodiversity conservation.

Conclusion and recommendations:

1- The conditions in which the animals are kept deserve to be evaluated to offer them more space and an enriched environment that allows them to express natural behaviors, as well as to consider their social behavior. Given that the zoo is old and the site offers limited space, a thorough reflection on its redevelopment seems pertinent.

2- An option worth considering is to focus on showcasing local biodiversity, which doesn't include many large mammals, and to become more involved in conservation programs for these species.

3- The installation of guided tours, interactive workshops, and controlled interaction spaces between animals and visitors in the zoo and garden, in addition to being a demand from visitors, would have a greater impact on public awareness and education, especially among the younger generation, on issues of animal biology and behavior, as well as biodiversity conservation.

4- The fact that birds are particularly appreciated by visitors suggests using them as flagship species, with the European goldfinch potentially serving as the emblem of the garden and zoo. This also highlights the zoo's potential to play a major role in conservation and reintroduction programs for this species, which has lost a significant part of its range in Algeria. Indeed, we believe there is potential for creating large aviaries within the garden, which could significantly contribute to a large-scale repopulation program for the European goldfinch in partnership with nature conservation agencies.

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Annex:

Veterinary care assessment:

	Veterinary Care	A	Q	UA	Nap	Nass
1	Is the animal collection under the supervision of a veterinarian?	A				
2	Does the level of veterinary supervision and care provided appear to be adequate for the size of the institution and number of animals accommodated?	A				
3	Is there clear effective communication between the veterinarian and the institution's animal care team?	A				
4	Is the response time between noticing/reporting an animal health problem and the receipt of appropriate veterinary care adequate?					
5	Is the veterinary examination/treatment room adequate and does it have suitable facilities to meet the needs of the collection?					
6	Is there proper, secure management of all veterinary medicines?					
7	Are the quarantine facilities and quarantine protocols appropriate?					
8	Are the biosecurity measures in place sufficient and suitable?					
9	Do the animals appear to be in good health, with no obvious signs or injury or illness?					
10	Do mutilation procedures appear to have been carried out on any of the animals?					
11	Is the frequency of visual inspection of the animals by keeper staff suitable and the protocol for reporting health concerns effective?					
12	Are keeper observations of general animal health and behaviour recorded?					
13	Is the frequency of routine clinical examinations for all of the animals appropriate?					
14	Is there a suitable preventative medicine programme in place?					
15	Does the facility normally perform necropsies?					
16	Are suitable samples from necropsies submitted for pathological analysis?					
17	Is the area where necropsies are performed suitable?					
18	Are deceased animals stored away from food and disposed of appropriately?					
19	Is there a safe and effective programme for the control of pests and where necessary, predators?					
20	Is there well maintained and appropriate animal capture equipment available on site, along with a sufficient number of trained staff to use it?					

21	Does the facility maintain up-to-date veterinary records on the health of individual animals within the collection?					
22	Does a review of clinical records, animal health management and disease issues take place?					
23	Are there written protocols for the euthanasia of animals?					
24	Is euthanasia carried out under veterinary supervision, or by a competent, senior staff member properly trained and experienced in the techniques used, who has access to the necessary equipment and facilities and who is available at all times?					
25	Are the circumstances mandating euthanasia or humane killing appropriate?					
26	Is there any form of ethical review or oversight?					
	Animal Management	**A**	**Q**	**UA**	**Nap**	**Nass**
27	Do the majority of the enclosures appear to be clean and well maintained?					
28	Where appropriate, are the animals maintained in social groups of suitable composition (eg number, age and sex ratio)?					
29	Are there any naturally social species currently housed in enclosures on their own?					
30	Does management practice ensure that undue dominance by individuals is avoided?					
31	Does management practice ensure that persistent and unresolved conflict is avoided?					
32	Does management practice ensure that physical carrying capacity is not overburdened?					
33	Is the total number of animals accommodated appropriate for the area of land occupied by the institution and the available resources?					
34	Does management practice ensure that an uncontrolled build-up of parasites and other pathogens is prevented?					
35	Is separate accommodation provided where appropriate for pregnant mothers and animals with young?					
36	Are animals kept in temporary accommodation? If yes, is their situation regularly and appropriately assessed?					
37	Do the majority of enclosure environments provide for the well-being of the animals throughout the year?					

38	Are the environmental temperature and humidity levels maintained appropriately for the animals?					
39	Is there adequate ventilation and appropriate lighting in indoor areas and holding areas?					
40	Are any of the enclosures located where there is loud or excessive noise?					
41	Are the majority of the enclosure substrates, design features and furniture sufficient to provide enough shelter and refuge for all					
	specimens displayed, including those kept in multi-species exhibits?					
42	Are the majority of the enclosure substrates, design features and furniture sufficient to provide for the behavioural needs of all individuals displayed, including those kept in multi-species exhibits?					
43	Is the drainage of the majority of enclosures safe, efficient and appropriate?					
44	In aquatic enclosures are appropriate water quality parameters measured and controlled?					
45	Is the equipment (including back up facilities) that is necessary to ensure correct enclosure environmental provision well maintained?					
46	Can personnel service all enclosures in a manner that is both safe to themselves and the inhabitants?					
47	If there are free ranging animals on site (eg peacocks, guinea fowl), are they monitored and is there a documented husbandry and management protocol for their care?					
	Behaviour & Mental Health	**A**	**Q**	**UA**	**Nap**	**Nass**
48	Do indoor, outdoor and holding enclosure areas all allow for normal behaviour patterns and ranges of movements to be expressed?					
49	Is environmental enrichment regularly provided?					
50	Are the animals generally bright, alert and interested and engaged in their surroundings?					
51	Are positive animal behaviours (eg play, exploration, rest, normal feeding, etc) observed?					
52	Are negative animal behaviours (eg over- grooming, avoidance, stereotyping, hyper- aggression, apathy, etc) observed?					

53	Are any of the animals restrained or tethered at any time?					
	Food and food hygiene	**A**	**Q**	**UA**	**Nap**	**Nass**
54	Are the animals generally in good body condition?					
55	Are there any animals that are underweight?					
56	Are there any animals that are overweight?					
57	Do all animals have ready access to plenty of clean, potable water?					
58	Is food sourced from a reputable supplier, ensuring that it is free from any contaminants?					
59	Is the quality of animal foodstuffs adequate and acceptable?					
60	Is the quantity of food provided for the animals documented, adequate and the consumption thereof, monitored?.					
61	Does the provided food meet the specific nutritional requirements of each species and of each individual?					
62	Is dietary supplementation given?					
63	Are supplies of food and drink prepared under hygienic conditions?					
64	Is food stored correctly to protect it from damp, deterioration and contamination by pests?					
65	Are perishable foods kept refrigerated?					
66	Is the manner of feeding safe for both the animals and the staff?					
67	Are there enough food and drinking sites so as to be accessible to every animal within a particular enclosure?					
68	Are food and drink provided in such a way that they meet the biological and behavioural needs of the animal?					
69	Are feeding enrichment techniques used?					
70	Are the diets of the animals reviewed regularly?					
71	Are there feeding protocols in place should hand rearing be necessary?					

72	Are live vertebrate animals offered as food to any animal?					
	Animal Records	**A**	**Q**	**UA**	**Nap**	**Nass**
73	Are up to date records (including husbandry details, daily behavioural observations, etc) held for all individual animals?					
74	Is the system of recording information easy to search, secure and fit for purpose?					
75	Does the facility have any form of collection plan?					
76	Can all of the animals held at the institution be individually identified? If so, what methods of individual animal identification are used?					
	Enclosures & Barriers	**A**	**Q**	**UA**	**Nap**	**Nass**
77	Are the enclosures and barriers designed, constructed and in such a condition to safely contain animals within the desired enclosures?					
78	Are the enclosures free from vegetation or other items that would aid animal escape?					
79	Are gates/doors to enclosures containing hazardous animals securely locked at all times?					
80	Do gates/doors to enclosures appear to be as strong and effective in containing the animals as the rest of the enclosure barrier?					
81	Where appropriate, are adequate standoff barriers provided to prevent direct contact between visitors and enclosures?					
	Visitors, Animal Contact & Training	**A**	**Q**	**UA**	**Nap**	**Nass**
82	Are the animals welfare needs appropriately managed with due regard to the requirements of the viewing public?					
83	Does the unregulated feeding of the animals by visitors take place?					
84	Is the regulated feeding of specific animals by visitors permitted? If so, under what specific circumstances is it allowed and how is it supervised, controlled and managed?					
85	Does the facility have animal demonstrations, shows and/or animal rides or undertake any form of animal contact?					
86	Are animals ever involved in animal contact situations off-site?					

87	Are animals handled only by or under the supervision of authorised personnel?					
88	Does the handling of animals by personnel appear to be consistent with the animal's welfare?					
89	If there are any animal-training programmes in place at the institution, are they documented and appropriate in technique, duration and purpose?					
90	Are appropriate barriers used to assist with training?					
91	Is physical punishment of the animals ever used?					
92	Is there regular monitoring and review of animal contact and training programmes?					
	Transactions and Transport	**A**	**Q**	**UA**	**Nap**	**Nass**
93	Are there facilities for crating and transporting animals?					
94	Are routine veterinary examinations performed prior to transport?					
95	Is quarantine implemented on arrival of acquisitions?					
96	Is animal population management regularly reviewed?					
97	Are acquisition and disposition activities legal and ethical?					
98	Are there records kept of the movement of animals into and out of the institution?					
	Health & Safety	**A**	**Q**	**UA**	**Nap**	**Nass**
99	Are there procedures and equipment in place in the event of a dangerous animal escape?					
100	Are the emergency protocols practised and if so, how often?					
101	Are records kept in the event of an animal escape/attack?					
102	Do staff receive training in animal health, disinfection principles and hygiene practices?					
103	Does the facility have clear procedures for working with hazardous animals?					
	Other	**A**	**Q**	**UA**	**Nap**	**Nass**
104	Are there adequate provisions for the proper storage and disposal of animal waste?					
105	Does the facility have continuing financial support?					
106	Does the total financial support appear to be adequate to meet the needs of the facility?					

	Personnel	A	Q	UA	Nap	Nass
107	Is the staff adequately directed?					
108	Is the staffing level appropriate to provide the required standards of animal husbandry and care?					
109	Do staff members regularly meet to discuss problems and possible solutions?					
110	In general do there appear to be good working relations in the zoos?					
111	Are animal care staff up to date with developments in their field of expertise?					
112	Is there provision for staff training and further development?					

Our Survey About Wildlife In The Zoo.

استبيان حول الحياة البرية في حديقة الحيوانات

نشكرك على مشاركتك في هذا الاستبيان حول الحياة البرية في حديقة الحيوان، أجوبتكم لها قيمة في مساعدتنا لفهم منظور الزوار وتحسين تجاربكم في كل زيارة.

الفضل الإجابة على بعض هذه الأسئلة بصراحة.

1. الفرد:
   - ذكر
   - أنثى
2. الفئة العمرية:
   - أصغر من 18
   - 18-24
   - 25-34
   - 53-44
   - 45-54
   - 55-64
   - 65 أو اكبر

3. كم مرة تزور حديقة الحيوانات :
   - نادرا
   - أحيانا

- بانتظام

4.ما هو السبب الرئيسي لزيارتك لحديقة الحيوانات ؟

- هدف تعليمي
- للترفيه
- نزهة عائلية
- غير ذلك (يرجى التحديد)

5. ما مدى رضاك عن تنوع الحياة البرية في هذه الحديقة ؟

- راضي جدا
- راضي
- حيادي
- غير راضي
- غير راضي جدا

6.ما هو نوع الحيوانات البرية الذي تجده أكثر إثارة للاهتمام (اختر حتى ثلاثة):

- الثدييات
- الطيور
- الزواحف
- البرمائيات
- السنوريات

7.ما مدى أهمية الرعاية بالحيوان بالنسبة لك عند زيارة حديقة الحيوانات ؟

- مهم جدا
- مهم
- محايد
- ليس مهم جدا
- ليس مهما على الإطلاق

8.هل تعتقد أن حديقة الحيوان تقوم بعمل مناسب لضمان رفاهية الحيوانات ؟

- اتفق تماما
- متفق
- حيادي
- معارض
- لا أوافق بشدة

9.في رأيك ما هي التدابير أو التحسينات التي تقترحها لتحسين الرعاية بالحيوان في هذه الحديقة ؟

10.ما هو تقييمك للمعلومات التعليمية المقدمة عن الحيوانات البرية في الحديقة؟

- ممتاز
- حسن
- متوسط
- سيئ
- سيئ جدا

11.ما هي أنواع البرامج والأنشطة التعليمية التي ترغب فيها عند زيارتك للحديقة؟

12.من مقياس 1 إلى 10، ما مدى رضاك عن تجربتك الشاملة في حديقة الحيوانات ؟

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

1.أقل رضى

10. الأكثر رضى

13.هل تعلمت أي شئ بعد زيارتك عن الحيوانات البرية ؟

14. رأيك في أسعار الدخول ؟

- منخفضة

- مناسبة
- غالية
- غالية جدا

15. إذا لم تربي هذه الحديقة السنوريات كالأسود و النمور هل أنت على استعداد الزيارة مجددا ؟

- نعم
- يمكن
- لا

16. في رأيك، إلى أي مدى تستعمل حدائق الحيوان في الحفاظ على الحياة البرية ؟

1. 2. 3. 4. 5.

1.مهم جدا

5.غير مهم على الإطلاق

17.هل شاركت في أي تجارب تفاعلية (مثل تأكيل الحيوانات أو الالتقاء بهم)؟

- نعم
- لا

إذا كانت الإجابة بنعم ، فكيف تقييمك للتجربة ؟

18. ما مدى رضاك عن المرافق العامة ووسائل الراحة في حديقة الحيوانات (مثل الحمامات و خيارات الجلوس وتناول الطعام)

1. 2. 3. 4. 5.

1 غير راض على الإطلاق

5.راض جدا