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Parâmetros oftalmológicos e ecobiométricos em graxaim-do-campo (*Lycalopex gymnocercus*) e graxaim-do-mato (*Cerdocyon thous*)



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ABSTRACT: Since ophthalmic data may differ between species, this study evaluated the ophthalmological and ecobiometric parameters in *Lycalopex gymnocercus* and *Cerdocyon thous*, and compare them with the values already described for wild and domestic canids. Twelve captive healthy wild canids were selected, including six *L. gymnocercus* (six females) and six *C. thous* (four males, two females), ages ranged from two to four years. The ophthalmic examination was performed under chemical restraint. Values of Schirmer tear test I (mm/min), intraocular pressure (mmHg) measured by rebound tonometry, and central corneal thickness (µm) determined with ultrasonic pachymetry were: 3.50 ± 0.84 , 11.83 ± 2.06 and 548.83 ± 13.64 for *L. gymnocercus*, and 5.67 ± 3.08 , 11.89 ± 3.17 and 531.83 ± 59.78 for *C. thous*. Anterior chamber depth, lens thickness, vitreous chamber depth, and axial globe length measured (mm) by B-mode ultrasound were: 3.32 ± 0.19 , 6.58 ± 0.23 , 6.82 ± 0.43 and 17.20 ± 0.73 for *L. gymnocercus*, and 3.45 ± 0.23 , 6.40 ± 0.19 , 6.63 ± 0.29 and 16.53 ± 0.30 for *C. thous*. *L. gymnocercus* had a yellowish-green tapetal fundus, while *C. thous* had a predominance of bluish-green coloration. In conclusion, the ophthalmological and ecobiometric parameters were similar in *L. gymnocercus* and *C. thous*, except for tapetal fundus color. The ecobiometric parameters compared to domestic dogs indicated that both wild canids presented a shallower anterior chamber, less lens thickness, and smaller ocular globe size.

Key words: canids, *Cerdocyon thous*, *Lycalopex gymnocercus*, veterinary ophthalmology.

Parâmetros oftalmológicos e ecobiométricos em graxaim-do-campo (*Lycalopex gymnocercus*) e graxaim-do-mato (*Cerdocyon thous*)

RESUMO: Este estudo teve como objetivo avaliar os parâmetros oftalmológicos e ecobiométricos em *Lycalopex gymnocercus* e *Cerdocyon thous*, e compará-los com os valores já descritos para canídeos selvagens e domésticos. Para realizar o objetivo, foram selecionados 12 canídeos selvagens clinicamente saudáveis mantidos em cativeiro, incluindo seis *L. gymnocercus* (seis fêmeas) e seis *C. thous* (quatro machos e duas fêmeas), com idades entre dois e quatro anos. Além disso, o exame oftalmológico foi realizado sob contenção química. Os resultados mostram que os valores do teste lacrimal de Schirmer I (mm/min), pressão intraocular (mmHg) mensurada por tonometria de rebote e espessura corneana central (µm) determinada por paquimetria ultrassônica foram: $3,50 \pm 0,84$, $11,83 \pm 2,06$ e $548,83 \pm 13,64$ para *L. gymnocercus*, e $5,67 \pm 3,08$, $11,89 \pm 3,17$ e $531,83 \pm 59,78$ para *C. thous*. A profundidade da câmara anterior, espessura da lente, profundidade da câmara vítrea e comprimento axial do globo ocular mensurados (mm) por ultrassonografia em modo B foram: $3,32 \pm 0,19$, $6,58 \pm 0,23$, $6,82 \pm 0,43$ e $17,20 \pm 0,73$ para *L. gymnocercus*, e $3,45 \pm 0,23$, $6,40 \pm 0,19$, $6,63 \pm 0,29$ e $16,53 \pm 0,30$ para *C. thous*. *L. gymnocercus* apresentou tapete fundico amarelo-esverdeado, enquanto *C. thous* apresentou predominância de coloração azul-esverdeada. Conclui-se que os parâmetros oftalmológicos e ecobiométricos foram semelhantes entre *L. gymnocercus* e *C. thous*, exceto pela coloração do tapete fundico. Os parâmetros ecobiométricos comparados aos cães domésticos indicaram que ambos os canídeos selvagens apresentaram câmara anterior mais rasa, menor espessura da lente e menor tamanho do globo ocular.

Palavras-chave: canídeos, *Cerdocyon thous*, *Lycalopex gymnocercus*, oftalmologia veterinária.

1 INTRODUCTION

2
3 There are six species of wild mammals in
4 Brazil belonging to the Order Carnivora and family

Canidae (JORGE & JORGE, 2014). The bush dog
(*Speothos venaticus*), maned wolf (*Chrysocyon
brachyurus*) and short-eared dog (*Atelocynus
microtis*) are species considered at risk of extinction

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by the International Union for Conservation of Nature (IUCN) (DI BITETTI et al., 2009; JORGE & JORGE, 2014; LUCHERINI, 2016), while the crab-eating fox (*Cerdocyon thous*), pampas fox (*Lycalopex gymnocercus*) and hoary fox (*Lycalopex vetulus*) are not (DI BITETTI et al., 2009; LUCHERINI, 2015; LUCHERINI, 2016; LEMOS, 2020).

The two most common species in the southern region of Brazil are the *L. gymnocercus* and the *C. thous* (QUEIROLO et al., 2013; LUCHERINI, 2015). The *L. gymnocercus* is a medium-sized animal with a triangular skull, long furry tail, and large triangular ears (QUEIROLO et al., 2013; LUCHERINI, 2015). Males weigh between 4 and 8 kg, while females weigh between 3 and 6 kg (JORGE & JORGE, 2014). They inhabit open, sub-humid to dry environments, such as clean fields, plantations, and pastures (DI BITETTI et al., 2009; QUEIROLO et al., 2013; JORGE & JORGE, 2014). The *C. thous* is also medium-sized animal, with males and females weighing between 4.5 and 8.5 kg (JORGE & JORGE, 2014; LUCHERINI, 2015). They prefer forest edges and deep woods in the cerrado and caatinga (JORGE & JORGE, 2014). Both species are omnivorous and have nocturnal habits (JORGE & JORGE, 2014; LUCHERINI, 2015; LUCHERINI, 2016).

Eye disorders are less commonly described in the wild canid family, possibly because of a lower disease frequency compared to domestic canines or limited research opportunities on wild canids (MOWAT & PEICHL, 2022). To conduct a proper ophthalmological examination on wild mammals, physical restraint, chemical immobilization, or both may be required, which may influence the results (FEATHERSTONE & HEINRICH, 2021; KERN, 2021).

Since ophthalmic data may differ between species and considering the lack of available data for *Lycalopex gymnocercus*, this study evaluated the ophthalmological and ecobiometric parameters in *L. gymnocercus* and *C. thous*, and compared them with values described for wild and domestic canids. To the best of the authors' knowledge, this is the first study to report ophthalmic data for *L. gymnocercus*. The hypothesis was that these values may vary between the two species of wild canids.

MATERIALS AND METHODS

Animal selection

The study was approved by the Animal Use Ethics Committee of the Universidade Federal Santa Maria (CEUA no. 8776130722) and by the National

Environmental and Wildlife Bureau (SISBIO no. 83634). The guidelines and criteria of the Association for Research in Vision and Ophthalmology (ARVO) were followed.

Twelve captive healthy wild canids were selected, including six *L. gymnocercus* (six females; body mass ranging from 5.6 to 7.9 kg) and six *C. thous* (four males, two females; body mass ranging from 2.9 to 7.7 kg). The animals were obtained from Municipal Zoo of Cachoeira do Sul and São Braz Wildlife Maintainer with ages ranged from two to four years.

Inclusion criteria were the absence of clinical evidence of ocular disease or previous eye problems. The exclusion criteria were the presence of ocular secretion, conjunctival hyperemia, corneal injury, or ocular discomfort. All animals underwent a complete physical examination and laboratory testing prior to inclusion in the study to ensure overall health status.

Ophthalmic examination

The animals were assessed in their original place to minimize stress. After 8 hours of fasting, the wild dogs were restrained with a net and tranquilized through intramuscular administration of ketamine hydrochloride (8 mg/kg), midazolam hydrochloride (0.5 mg/kg), and dexmedetomidine (3 µg/kg). During the ophthalmic examination, the animals were placed in a sternal recumbency to reduce interference with intraocular pressure. They were also given 100% oxygen supplementation via nasal tube and were continuously monitored using a multiparameter monitor. The ophthalmic examination was initiated approximately 15 minutes after anesthetic induction, following adequate sedation and stabilization of the animals.

The ophthalmic examination was performed in a sequence as follows: inspection of the eye, orbit, and adnexa with and without a light source; pupillary light reflex, both direct and indirect; Schirmer tear test (STT I); rebound tonometry (intraocular pressure, IOP); fluorescein staining; ocular pachymetry; ocular ultrasonography; and indirect ophthalmoscopy.

To conduct the STT I, a millimeter test strip (Teste de Schirmer, Ophthalmo, São Paulo, Brazil) was placed in the lower conjunctival sac for 60 seconds, and the wetting amount was then measured. IOP was measured using the rebound tonometer in "do" calibration mode (TonoVet®, Icare, Tuusula, Finland). The integrity of the cornea was assessed with a 1% sodium fluorescein dye drop (Fludiat®, Oftalmopharma, São Paulo, Brazil).

After these tests, topical anesthesia was administered using 1% tetracaine combined with 0.1% phenylephrine hydrochloride eye drops (Allergan, São Paulo, Brazil). The central corneal thickness (CCT) was measured using ultrasonic pachymetry (Reichert iPac® Pachymeter, Reichert, New York, United States). After topical administration of 1% tropicamide, B-mode ocular ultrasonography with a 10 MHz linear probe (Mindray D52, São Paulo, Brazil) was performed with the eyelids manually held open, while sterile coupling gel was applied directly to the corneal surface. Following ultrasonography, the ocular surface was thoroughly cleaned with sterile saline solution, and indirect ophthalmoscopy (Volk iNview®, Volk, Ohio, USA) was subsequently performed after adequate pupillary dilation was achieved.

The average duration of the ophthalmic examination under chemical restraint was approximately 30 minutes per animal. At the end of the ophthalmic examination, dexmedetomidine was reversed with atipamezole (5 µg/kg) administered intramuscularly. The animals were monitored until complete anesthetic recovery.

Statistical analysis

Comparisons between right and left eyes were performed using the Wilcoxon signed-rank test. For comparisons between species, mean values from both eyes were calculated for each animal and compared using the Mann-Whitney U test. Statistical significance was set at $P < 0.05$.

RESULTS

No significant differences were found between *L. gymnocercus* and *C. thous* for Schirmer tear test I, intraocular pressure, or central corneal thickness (Mann-Whitney test, $P > 0.05$). Comparisons between right and left eyes also showed no significant differences (Wilcoxon test, $P > 0.05$).

Therefore, mean values combining both eyes for each species are presented in table 1.

Ultrasonography of the eyes in both *L. gymnocercus* and *C. thous* revealed the following features: the cornea appeared as a hyperechoic curvilinear line; the anterior chamber was anechoic; the lens was ovoid in shape, with the anterior and posterior capsules visualized as hyperechoic curvilinear lines surrounding an anechoic central region; the ciliary body showed medium echogenicity and was visible on each side of the lens; the vitreous chamber appeared anechoic; and the posterior wall of the eye (retina, choroid, and sclera) displayed an echogenic pattern (Figure 1). The mean values of the ultrasound measurements, including both right and left eyes for each species, are presented in table 2.

Both species had retinas with a holangiotic vascular pattern and a bright tapetal background. In *L. gymnocercus* the coloration was yellowish-green, while *C. thous* there was a predominance of bluish-green coloration (Figure 2). Both retinas had an oval-shaped myelinated nerve in the tapetal region and a dark non-tapetal region with brown coloration.

DISCUSSION

The present study provided the first comprehensive description of ophthalmic and ecobiometric parameters in *L. gymnocercus*, contributing novel data for this species. The results did not support the initial hypothesis that these values may vary between the two species of wild canids, as no significant differences were observed between *L. gymnocercus* and *C. thous* for the evaluated parameters. These findings suggested similar ocular characteristics between these species and expand the current knowledge on wild canid ophthalmology, supporting clinical assessment and comparative studies.

The Schirmer I tear test value for *C. thous* in this study (5.67 ± 3.08 mm/min) was similar to those reported for the same species in captivity ($4.33 \pm$

Table 1 - Values of Schirmer tear test I (SST I), intraocular pressure measured by rebound tonometry (IOP), and central corneal thickness determined with ultrasonic pachymetry (CCT) of both eyes of *Lycalopex gymnocercus* and *Cerdocyon thous* (mean $\pm$ SD).

Species	STT I (mm/min)	IOP (mmHg)	CCT (µm)
<i>L. gymnocercus</i>	3.50 ± 0.84	11.83 ± 2.06	548.83 ± 13.64
<i>C. thous</i>	5.67 ± 3.08	11.89 ± 3.17	531.83 ± 59.78
P-values	0.88	0.94	0.42

SST I: Schirmer tear test I, IOP: intraocular pressure; CCT: central corneal thickness. P-values were obtained using the Mann-Whitney U test.

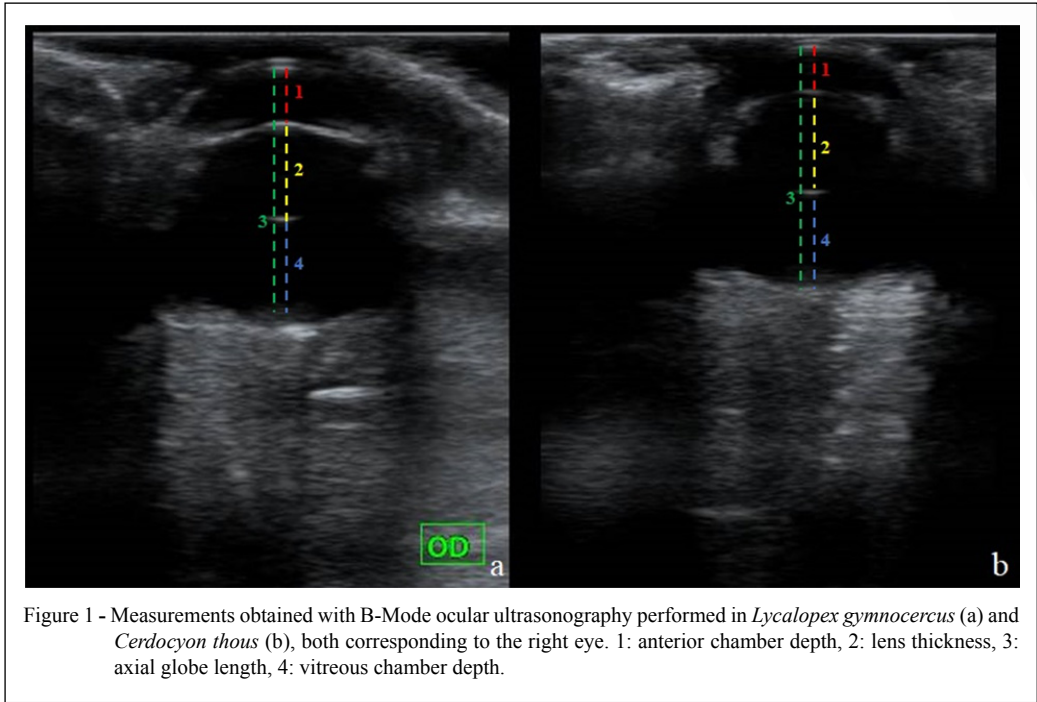


Figure 1 - Measurements obtained with B-Mode ocular ultrasonography performed in *Lycalopex gymnocercus* (a) and *Cerdocyon thous* (b), both corresponding to the right eye. 1: anterior chamber depth, 2: lens thickness, 3: axial globe length, 4: vitreous chamber depth.

2.96 mm/min) (CARVALHO et al., 2020) but differed from *C. thous* of free-living (13.37 ± 3.79 mm/min) (RENZO et al., 2020). Although the Schirmer I tear test value for *L. gymnocercus* (3.50 ± 0.84 mm/min) was lower than *C. thous*, no statistical difference was detected. In domestic dogs, clinical interpretation typically defines values above 15 mm/min as normal aqueous tear production, readings below this threshold are indicative of keratoconjunctivitis sicca or ‘dry eye’ (KOMNENOU et al., 2013). Consequently, the results for both wild canids in this study are markedly lower than established domestic canine reference ranges for healthy, conscious animals, which vary from 17.03 ± 3.23 mm/min (RUJIREKASUWAN et al., 2024) to 18.62 ± 3.65 mm/min (KOMNENOU et

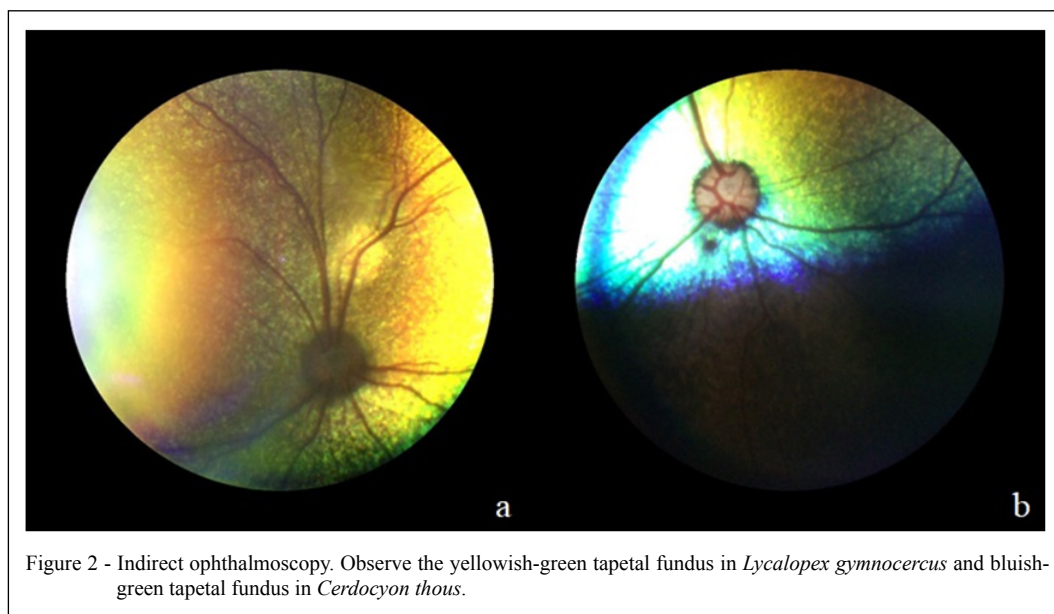
al., 2013), as well as other reported values such as 18.80 ± 2.62 mm (SAITO & KOTANI, 2001), 22.75 ± 3.88 mm/min (NASCIMENTO et al., 2023), or 23.56 ± 3.98 mm/min (VISSER et al., 2017).

The anesthesia protocols and origin of the animals likely influenced these differences. Studies in domestic canines demonstrated that sedation with alpha-2 agonists and opioids profoundly reduces STT I values (SANCHEZ et al., 2006; RAUSER et al., 2012; KOVAŁČUKA et al., 2021). Specifically, the use of a medetomidine-propofol protocol has been shown to cause a statistically significant drop in tear production immediately following anesthesia, with mean values as low as 3.24 ± 3.24 mm/min and 3.92 ± 3.92 mm/min (KOMNENOU et al., 2013).

Table 2 - Ultrasonographic measurements (mm) of ocular structures in both eyes of *Lycalopex gymnocercus* and *Cerdocyon thous* (mean $\pm$ SD).

Species	-----ACD-----	-----LT-----	-----VCD-----	-----AGL-----
<i>L. gymnocercus</i>	3.32 $\pm$ 0.19	6.58 $\pm$ 0.23	6.82 $\pm$ 0.43	17.20 $\pm$ 0.73
<i>C. thous</i>	3.45 $\pm$ 0.23	6.40 $\pm$ 0.19	6.63 $\pm$ 0.29	16.53 $\pm$ 0.30
P-values	0.18	0.20	0.30	0.07

ACD: anterior chamber depth; LT: lens thickness; VCD: vitreous chamber depth; AGL: axial globe length. P-values were obtained using the Mann-Whitney U test.



These values in domestic dogs under anesthesia are remarkably similar to the results observed in our wild canids, suggesting that the reduced tear production is a transient effect of chemical restraint rather than a pathological state (KOMNENOU et al., 2013).

Despite this anesthetic influence, potential species-specific physiological differences in lacrimal function should be considered. Wild canids may present lower basal tear production than domestic dogs due to ecological adaptations, particularly in species from open or semi-arid environments, such as *L. gymnocercus*. However, additional studies performed under different clinical conditions are necessary to further investigate this hypothesis. However, since the evaluation of wild animals without chemical restraint is not recommended, it is essential to emphasize that physical and chemical restraint are confounding factors that can affect pupillary diameter, intraocular pressure, and tear production (KOMNENOU et al., 2013; KERN, 2021).

Considering these influences, certain limitations of the present study must be considered. While providing novel data for *L. gymnocercus* and *C. thous*, the small sample size may have reduced the statistical power, potentially limiting the detection of subtle interspecies differences. Furthermore, as previous studies confirm that alpha-2 adrenergic agonists like medetomidine significantly reduce tear production during anesthesia (KOMNENOU et al., 2013), and that anesthetic agents may influence various ocular responses, the parameters obtained

here must be interpreted within the context of the anesthetic protocol used.

The present study utilized a rebound tonometer, as intraocular pressures obtained with the rebound tonometer in domestic dogs were found to be consistent with those obtained by applanation tonometry (LEIVA et al., 2006). Intraocular pressure values for *L. gymnocercus* (11.83 ± 2.06 mmHg) and *C. thous* (11.89 ± 3.17 mmHg) were similar using the TonoVet® “do” calibration mode. These values were comparable to those reported for *C. thous* in captivity using the same tonometer and calibration (10.70 ± 3.43 mmHg), as well as applanation tonometry (11.70 ± 5.70 mmHg, TonoPen® XL) (CARVALHO et al., 2020). The calibration mode may influence the results in *C. thous*, as values of 5.66 ± 3.45 mmHg and 17.00 ± 4.64 mmHg were found with TonoVet® P calibration and TonoVet® Plus dog calibration, respectively (CARVALHO et al., 2020). Mean values for intraocular pressures in domestic dogs have shown variations, such as 8.61 ± 2.63 mmHg (GARZÓN-ARIZA et al., 2018), 9.15 ± 3.47 mmHg (LEIVA et al., 2006), and 15.0 ± 3.2 mmHg (BEN-SHLOMO & MUIRHEAD, 2021).

The central corneal thickness measured with ultrasonic pachymetry, in *L. gymnocercus* (548.83 ± 13.64 μm) was similar to *C. thous* (531.83 ± 59.78 μm). A study on *C. thous* using non-contact specular microscopy also reported values of 0.53 ± 0.04 mm (RENZO et al., 2020). However, another study suggested that non-contact specular microscopy

could underestimate corneal thickness values compared to ultrasonic pachymetry (RANZANI et al., 2008). In domestic canines, central corneal thickness measured through ultrasonic pachymetry in various studies revealed mean values of $562 \pm 6.2 \mu\text{m}$ (GILGER et al., 1991) and $598.54 \pm 32.28 \mu\text{m}$ (ALARIO & PIRIE, 2014). However, more recent and comprehensive data from a study of 108 dogs established a predicted mean CCT of $613 \pm 9.4 \mu\text{m}$ for normal eyes (HOEHN et al., 2018). This contemporary study also demonstrated that CCT in domestic dogs is influenced by factors such as age and body mass, increasing linearly by $6.9 \pm 1.8 \mu\text{m}$ per year and $1.6 \pm 0.8 \mu\text{m}$ per kg, respectively (HOEHN et al., 2018). Additionally, no significant differences in corneal thickness were identified between the various breeds evaluated in that study (HOEHN et al., 2018).

In this study, B-mode ultrasound was used to perform ocular echobiometry, which enabled the determination of various intraocular measurements and evaluation of internal structures. This method is widely recognized in veterinary medicine as a precise, non-invasive, and easily applied diagnostic tool for the anatomic and biometric characterization of the ocular globe segments (GONZALEZ et al., 2001, SILVA et al., 2018). Recent studies in healthy dogs have confirmed that B-scan ultrasonography is highly reliable for identifying variations in ocular size and shape within the clinical routine, providing accurate assessments of structures such as axial length, anterior chamber depth, and lens thickness without the need for sedation (SILVA et al., 2018). Furthermore, the technique is advantageous because it is easily applicable in clinical routine and often does not require sedation.

The axial globe length was analogous between *L. gymnocercus* ($17.20 \pm 0.73 \text{ mm}$) and *C. thous* ($16.53 \pm 0.30 \text{ mm}$), despite some morphological differences in head shape (JORGE & JORGE, 2014; LUCHERINI, 2015; LUCHERINI, 2016). A mean value of $15.93 \pm 1.14 \text{ mm}$ has also been described for free-ranging *C. thous* (RENZO et al., 2020). On the other hand, domestic dogs have higher mean values, such as $20 \pm 1.6 \text{ mm}$ (WILLIAMS, 2004), $19.95 \pm 1.05 \text{ mm}$ (SILVA et al., 2010), and $18.80 \pm 0.90 \text{ mm}$ (GONÇALVES et al., 2000), which may be related to differences in breeds. Corroborating these findings, a recent study using computed tomography reported axial globe lengths of $18.58 \pm 1.34 \text{ mm}$ for brachycephalic (BC) and $18.61 \pm 1.38 \text{ mm}$ for non-brachycephalic (NB) breeds, showing that these dimensions remain relatively consistent in domestic

dogs regardless of skull type (RUJIREKASUWAN et al., 2024).

The values for anterior chamber depth were $3.32 \pm 0.19 \text{ mm}$ for *L. gymnocercus* and $3.45 \pm 0.23 \text{ mm}$ for *C. thous*, and vitreous chamber depth were $6.82 \pm 0.43 \text{ mm}$ for *L. gymnocercus* and $6.63 \pm 0.29 \text{ mm}$ for *C. thous*. These values were the same as those reported for free-ranging *C. thous*, which were $3.29 \pm 0.56 \text{ mm}$ for anterior chamber depth and $6.61 \pm 0.84 \text{ mm}$ for vitreous chamber depth (RENZO et al., 2020). In domestic dogs, the mean values for anterior chamber depth were described as $3.8 \pm 0.1 \text{ mm}$ (WILLIAMS, 2004), $3.37 \pm 1.04 \text{ mm}$ (SILVA et al., 2010), and $3.90 \pm 0.70 \text{ mm}$ (GONÇALVES et al., 2000). However, more recent data indicates slightly shallower chambers, with values of $2.99 \pm 0.52 \text{ mm}$ in BC and $3.05 \pm 0.38 \text{ mm}$ in NB dogs (RUJIREKASUWAN et al., 2024).

Conversely, in domestic dogs the mean values for vitreous chamber depth were higher, including $9.52 \pm 0.70 \text{ mm}$ (SILVA et al., 2010) and $9.10 \pm 0.40 \text{ mm}$ (GONÇALVES et al., 2000). Recent measurements confirm this trend, with values of $8.22 \pm 0.66 \text{ mm}$ (BC) and $7.99 \pm 0.82 \text{ mm}$ (NB), the vitreous chamber is a major contributor to the domestic dog's globe volume, accounting for approximately 80% of its total size (RUJIREKASUWAN et al., 2024).

Lens thickness values were $6.58 \pm 0.23 \text{ mm}$ for *L. gymnocercus* and $6.40 \pm 0.19 \text{ mm}$ for *C. thous*, while in free-ranging *C. thous* were related as $6.02 \pm 0.47 \text{ mm}$ (RENZO et al., 2020). In domestic dogs, the mean values varied, such as $6.70 \pm 1.0 \text{ mm}$ (WILLIAMS, 2004), $7.06 \pm 0.47 \text{ mm}$ (SILVA et al., 2010), and $6.10 \pm 1.20 \text{ mm}$ (GONÇALVES et al., 2000). More recent biometric analysis shows lens thickness of $7.35 \pm 0.93 \text{ mm}$ in BC and $7.56 \pm 0.72 \text{ mm}$ in NB breeds (RUJIREKASUWAN et al., 2024), these updated values suggested that domestic dogs generally possess a thicker lens compared to the wild canids evaluated in this study.

The retinas of *L. gymnocercus* and *C. thous* exhibited several similarities. Both species showed a holangiotic vascular pattern. However, the optic nerve in *L. gymnocercus* tended to be circular to rounded, with well-defined margins and greater myelination, whereas in *C. thous* it appeared more triangular and less myelinated. In both canids, the optic disc was located within the tapetal area. The tapetal fundus was slightly brighter in *L. gymnocercus*, while both species displayed a brown non-tapetal region, as previously reported for *C. thous* (CARVALHO et al., 2020; RENZO et al., 2020). These characteristics were confirmed in both wild canids in the present

study. Nonetheless, *L. gymnocercus* exhibited a subtle tendency toward a tapetal background with a faint greenish-yellow hue, which is likely associated with variations in choroidal pigmentation in *L. gymnocercus* when compared with *C. thous*.

CONCLUSION

The ophthalmological and ecobiometric parameters were similar in *L. gymnocercus* and *C. thous*, except for tapetal fundus colour. The ecobiometric parameters compared to domestic dogs indicated that both wild canids presented a shallower anterior chamber, less lens thickness, and smaller ocular globe size.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available directly from the correspondent author upon request.

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DECLARATION OF CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in the data presented in this work.

AUTHORS' CONTRIBUTIONS

All authors contributed equally to the conception and writing of the manuscript. All authors critically reviewed the manuscript and approved the final version.

BIOETHICS AND BIOSECURITY COMMITTEE APPROVAL

This study was approved by the Animal Use Ethics Committee (CEUA no. 8776130722) and by the Sistema de Autorização e Informação em Biodiversidade (SISBIO no. 83634).

DECLARATION OF USE OF ARTIFICIAL INTELLIGENCE

In this paper, we did not use AI tools for paper writing and data processing, but only used it to enhance the quality of writing.

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