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## **Clinical ophthalmic parameters of the Quaker parrot (*Myiopsitta monachus*)**

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**Running Title:** Ophthalmic parameters of the Quaker parrot

**Abstract:**

*Purpose:* Ophthalmic diagnosis in many avian species remains hindered by lack of normative values. This study aimed to establish normal ophthalmic parameters for select diagnostic tests in clinically normal Quaker parrots. *Methods:* Ninety-six captive Quaker parrots ages 8-18 years underwent ophthalmic examination to include assessment of neuro-ophthalmic reflexes, phenol red thread test, rebound tonometry, fluorescein staining, palpebral fissure length measurements, slit lamp biomicroscopy, indirect fundoscopy, and ocular ultrasound biometry. *Results:* Menace response, dazzle reflex, and direct pupillary light reflex were present for all Quaker parrots. Tear production (mean  $\pm$  SD) was  $13.3 \pm 4.0$  mm/15 sec and intraocular pressure (IOP, mean  $\pm$  SD) was  $10.6 \pm 1.4$  mmHg and  $6.0 \pm 1.3$  mmHg in the D and P rebound tonometer calibration settings, respectively. For IOP measurement, D and P calibration settings were not interchangeable, with the lesser variation of the D setting preferred in the absence of a gold standard. Ultrasound measurement of the anterior chamber depth increased with age and males had longer axial globe and vitreous lengths. Incidental adnexal and ocular lesions, identified in 36/96 (37.5%) of Quaker parrots, did not statistically affect the created reference data. *Conclusions:* This work provides reference values and clinical findings to assist with monitoring the health of wild populations and maintaining the health of captive Quaker parrots.

**Key words:** avian ophthalmology, eye, psittaciforme, tear production, tonometry, ultrasound biomicroscopy





TEXAS A&M UNIVERSITY

Veterinary Medicine  
& Biomedical Sciences

# A clinical study of ophthalmic parameters of the Quaker parrot (*Myiopsitta monachus*)

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## Introduction

Veterinarians attending exotic animals often lack normative medical data to assist with diagnosis of various diseases. Variation in ocular anatomy among avian species requires establishing species-specific reference values in order to assess ocular health. Within the Psittacidae family, tear production measurements and ocular ultrasound biometric values are available for Amazon parrots (*Amazona aestiva*), and intraocular pressure measurements have been described for the budgerigar (*Melopsittacus undulatus*) and ring-necked parakeet (*Psittacula kramera*).<sup>1-3</sup> Ophthalmic studies and the prevalence of ophthalmic disease of the Quaker parrot (*Myiopsitta monachus*) have not been reported. The continued popularity of Quaker parrots as household pets and recent growth of feral populations based on deliberate and accidental release into the wild, supports the need to report ophthalmic reference values and clinical findings to appropriately care for this parrot species.<sup>4</sup>

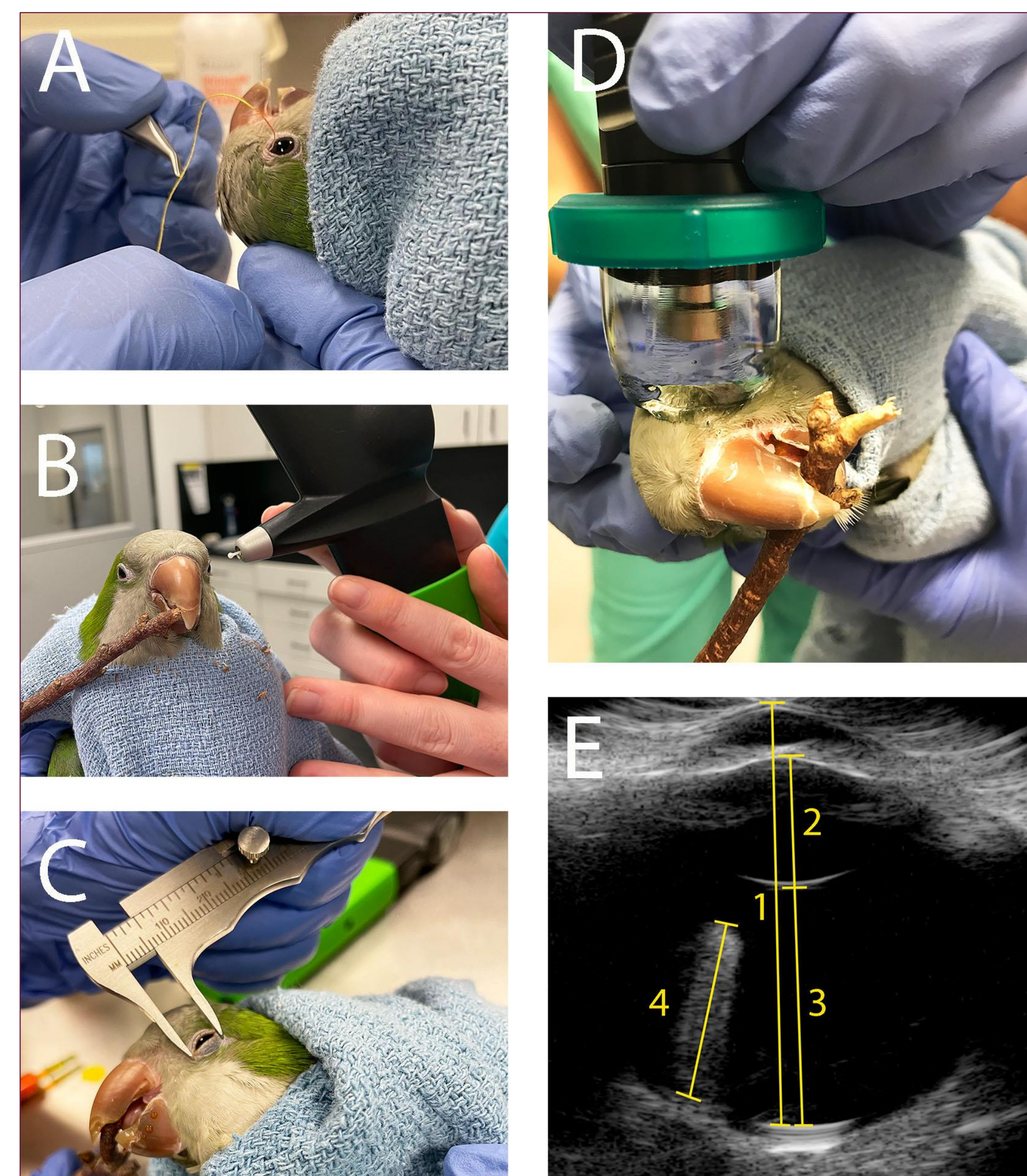
## Purpose

To establish normal ophthalmic parameters for select diagnostic tests and characterize ocular lesions in a captive population of Quaker parrots of varying age, weight, and sex.

## Methods

Adult Quaker parrots (n = 96) of known age (avg 8.1 +/- 3.1 y) and sex (40 ♀, 56 ♂). Underwent complete ophthalmic examinations including neuro-ophthalmic reflexes, phenol red thread test (PRTT), intraocular pressure (IOP) via rebound tonometry calibration settings of D=dog and P=other species, fluorescein staining, horizontal palpebral fissure length, slit lamp biomicroscopy, indirect funduscopy, and ocular ultrasound biometry. Measurements of axial globe length, anterior chamber depth, lens thickness, vitreous length, and pecten length were recorded. Measures of association and descriptive statistics were performed using Analyse-it v5.81.

All procedures approved: TAMU-IACUC AUP # 202-0171

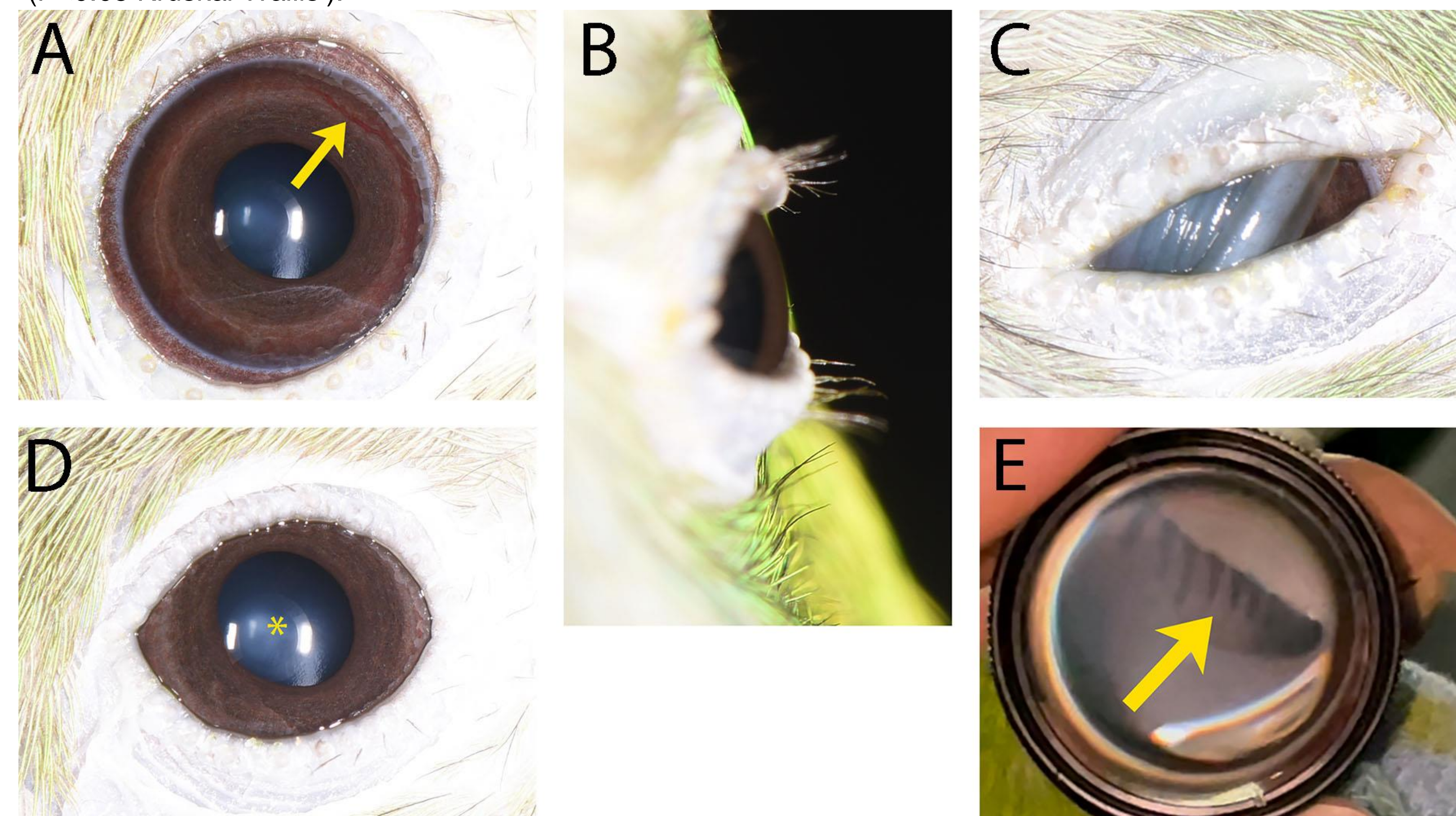


**Figure 1:** (A) Tear production measurement using PRTT; (B) IOP measurement using rebound tonometry; (C) Palpebral fissure length measurement using Jameson calipers; (D) Ocular ultrasound biomicroscopy; (E) Ocular ultrasound image with measurements of axial globe length (1), lens thickness (2), vitreous length (3), and axial pecten length (4). Anterior chamber depth was calculated by the equation  $1 - (2+3)$ .

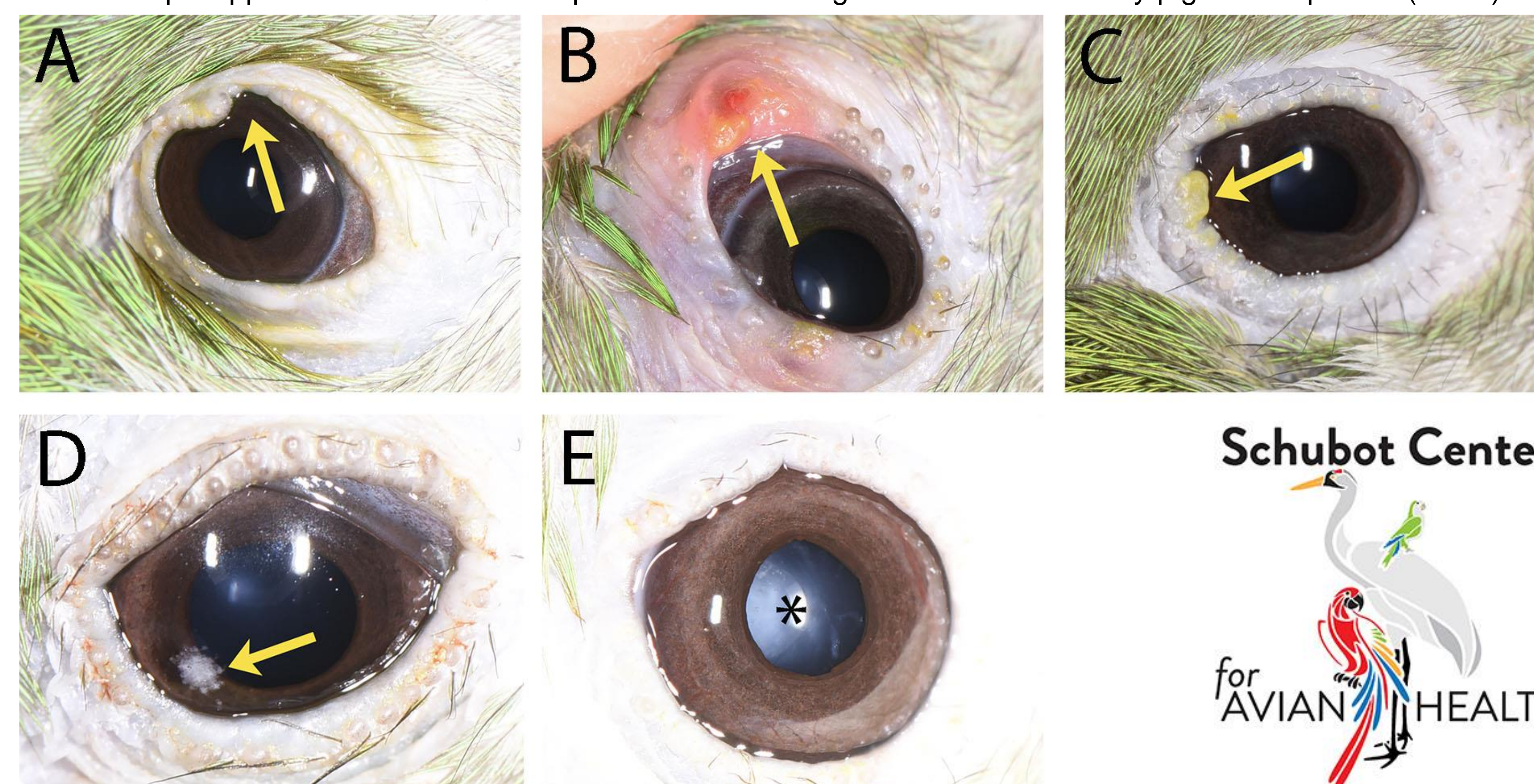
## Results

Measurement	Units	Mean ± SD	Range
Weight	mg	130.6 ± 16.3	95.5 – 176.5
Body condition Score	1-5	3.3 ± 0.7	2 – 5
PRTT	mm/15 sec	13.4 ± 3.9	2 – 30
IOP: D setting	mm Hg	10.6 ± 1.4	7 – 16
IOP: P setting	mm Hg	6.0 ± 1.3	3 – 11
Palpebral fissure length	mm	0.6 ± 0.02	0.5 – 0.65
Axial globe length	mm	8.1 ± 0.23	7.47 – 8.61
Anterior chamber depth	mm	0.96 ± 0.12	0.58 – 1.23
Lens thickness	mm	2.6 ± 0.12	2.17 – 2.92
Vitreous length	mm	4.5 ± 0.19	3.94 – 5.08
Axial pecten length	mm	3.3 ± 0.30	2.5 – 4.16
Oblique pecten length	mm	3.6 ± 0.36	2.3 – 4.65

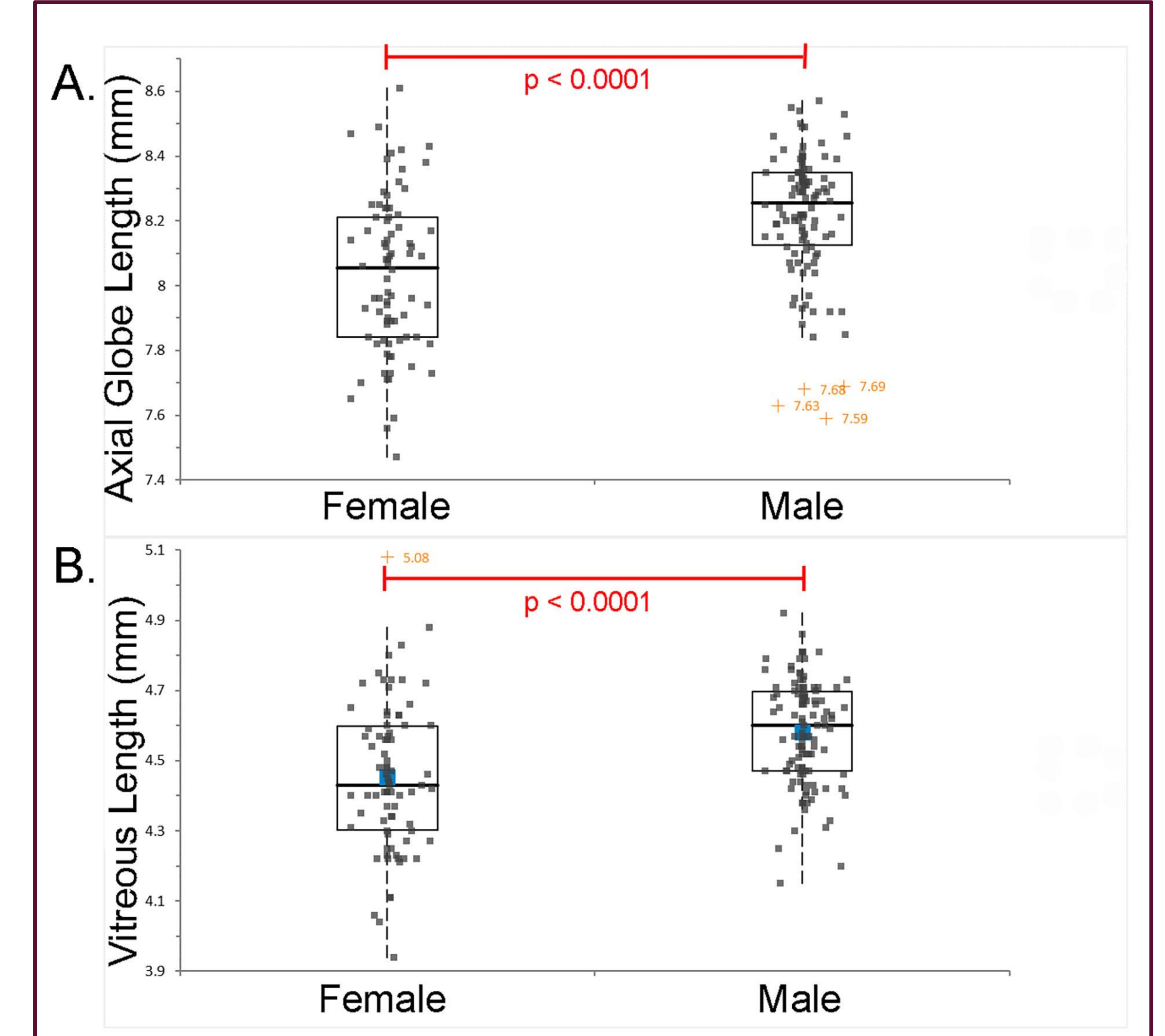
**Table 1:** Reference values of select diagnostic tests in 192 eyes of 96 Quaker parrots. Comparison of eyes with incidental ocular lesions to healthy unaffected eyes failed to reveal significant differences in measurements ( $P < 0.05$  Kruskal-Wallis).



**Figure 3:** (A) Normal external appearance of the Quaker parrot eye with dark brown iris and prominent major arterial circle (arrow). (B) Eyelid margins contain cilia derived from modified feathers. (C) The nictitating membrane is semitransparent and nonpigmented. (D) Nuclear sclerosis was noted in older parrots >7 years (asterisk). (E) Normal fundoscopic appearance of the Quaker parrot with an anangiomatic retina and heavily pigmented pecten (arrow).



**Figure 4:** Ocular lesions were visualized in 38/192 eyes of 25/96 Quaker parrots, and included (A) eyelid laceration (arrow), (B) traumatic blepharitis (arrow), (C) eyelid margin mass (arrow), (D) corneal lipid degeneration (arrow), (E) and cataracts (asterisk). Other findings not pictured included mucoid discharge, blepharodema, conjunctival hemorrhage, conjunctival hyperemia, and corneal erosion.



**Figure 2:** Ocular ultrasound measurements varied based on sex. Males had longer (A) axial globe and (B) vitreous lengths compared to females ( $p < 0.0001$ ). Anterior chamber depth, lens thickness, and pecten length were not affected by sex.

## Summary and Discussion

All Quaker parrots had positive menace responses, dazzle reflexes, and direct pupillary light reflexes. No difference in laterality was observed so values for left and right eyes were combined and averaged prior to analysis (Table 1). Tear production (PRTT) was not affected by the age, weight, or sex of Quaker parrots. Intraocular pressure (IOP) was not affected by age or weight. Female parrots had slightly higher IOPs compared to males in the D setting ( $p < 0.001$ ); however, given the IOP range of this species, these values were not clinically significant.

Axial globe length was positively correlated with weight ( $p = 0.0013$ ). Males weighed more ( $p < 0.0028$ ) and had longer axial globe and vitreous lengths compared with females ( $p < 0.0001$ ) (Figure 2).

Normal variations in ocular anatomy and incidental ocular lesions were recorded (Figures 3 & 4). Limitations of this study include a lack of juvenile parrots for comparison, and the relatively small eye size which may affect the validity of tonometry results.

## Conclusions

This first report of normal ophthalmic parameters and clinical findings in a captive flock of Quaker parrots will facilitate diagnosis and treatment of ocular disease in this parrot species and support monitoring the health of both wild and captive populations of this and other small parrot species.

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