

OPHTHALMIC DIAGNOSTIC TESTS IN PARROTS (*AMAZONA AMAZONICA*) AND (*AMAZONA AESTIVA*)



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Abstract

The aim of this study was to evaluate the ophthalmic parameters of *Amazona amazonica* and *Amazona aestiva* maintained in captivity in Salvador, Bahia, Brazil. Median \pm S-IQR phenol red thread test was 21.9 ± 2.3 mm/15 s and 12.6 ± 2.6 mm/15 s, endodontic absorbent paper point tear test 14.9 ± 1.6 mm/min and 13.1 ± 1.4 mm/min, and intraocular pressure 8.3 ± 1.1 mm Hg and 9.7 ± 1.7 mm Hg for *A. amazonica* and *A. aestiva*, respectively. Corneal sensitivity was 0.50 ± 0.25 cm for *A. amazonica* and 1.00 ± 0.00 cm for *A. aestiva*. The mean ultrasonographic dimensions measured were anterior chamber depths of 2.0 ± 0.1 mm and 2.0 ± 0.1 mm, lens axial lengths of 3.6 ± 0.0 mm and 3.6 ± 0.1 mm, vitreous chamber depths of 7.9 ± 0.4 mm and 8.0 ± 0.2 mm, axial globe lengths of 13.5 ± 0.4 mm and 13.6 ± 0.1 mm, and pecten oculi lengths of 6.4 ± 0.5 and 6.3 ± 0.3 mm for *A. amazonica* and *A. aestiva*, respectively. The development of complementary knowledge about the ocular morphology and histology of these parrot species can be used to contribute to advances in the ophthalmology of wild birds. Copyright 2016 Elsevier Inc. All rights reserved.

Key words: intraocular pressure; corneal sensitivity; ultrasonography; phenol red; pecten oculi

Brazil has a great variety of Psittacidae species. These birds inhabit various biomes and are the reason the country is nicknamed "Parrot Land." The Psittacidae species of Brazil are considered popular companion animals, which often subjects these birds to illegal trafficking.¹⁻³ Birds of the genus *Amazona* have a curved beak and variably colored feathers.⁴ The *Amazona* spp. include, among others, the orange-winged amazon (*Amazona amazonica*) that measures approximately 31 cm in length and weighs between 300 and 400 g, and the blue-fronted amazon (*Amazona aestiva*) that is approximately 38 cm long and weighs approximately 400 g. Both *Amazona* spp. are distributed throughout South America³ and are classified as common occurrence.²

Studies aimed at the establishment of ophthalmic parameters, such as evaluation of tear production and measurement of intraocular pressure (IOP), have been conducted in various wild avian species to improve veterinary medical knowledge regarding diagnostic testing and the birds' health and conservation.⁵⁻¹¹ Despite the fact that vision is indispensable for birds, there are not many studies of ophthalmic parameters in

parrots of the genus *Amazona*, with only a paucity of published reports on tear production,¹¹ ocular ultrasonography,⁹ and a retrospective study of eye disorders.¹ A more accurate diagnosis of eye diseases and knowledge of morphophysiological ocular characteristics of these birds are essential, but are difficult to obtain, in part owing to limited diagnostic methods⁷ and to a lack of reference values.^{6,12,13}

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The aim of this study was to evaluate the ophthalmic parameters of *A. amazonica* and *A. aestiva* maintained in captivity in Salvador, Bahia, Brazil.

MATERIALS AND METHODS

Animals

A total of 32 healthy, captive adult birds (16 *A. amazonica* and 16 *A. aestiva*), aged 1 to 20 years and of unknown sex, from the Triage Center for Wild Animals were used for the study.

All birds were restrained with catch nets and leather gloves during the morning hours with temperature and relative humidity ranging between 26.5°C and 27.8°C and 64% and 76%, respectively, taking care not to apply pressure to the neck region, as this may have affected IOP readings. Before the investigation, all birds were evaluated for signs of systemic disease and abnormalities of the eye and periocular region; birds were excluded in cases of significant abnormal findings.

The study was approved by the Authorization and Information System on Biodiversity, Brazilian Ministry of the Environment (27489-1) and by the Animal Ethics Committee of the Federal University of Bahia (21/2014), and conducted in accordance with the Association for Research in Vision and Ophthalmology (ARVO) Statement for the Use of Animals in Ophthalmic and Vision Research.

Data were collected in 4 stages over different days. Stages 1 to 3 were conducted in the Triage Center for Wild Animals, and the fourth stage was performed at the Radiology and Ultrasound Service of the Veterinary Hospital of the Federal University of Bahia.

Stage 1: Phenol Red Thread Test and Palpebral Fissure Length Measurement. The phenol red thread test (PRTT) was performed by pulling the lower eyelid of each eye rostrally, before insertion of the thread (JM Medtech, Franklin, TN USA) into the lower conjunctival sac for 15 seconds with the aid of Adson Brown forceps. After removal of the thread, the moistened part of the removed thread was measured using a digital caliper (Mitutoyo, São Paulo, Brazil) (Fig. 1A).

Stage 2: Endodontic Absorbent Paper Point Tear Test, Tonometry, and Conjunctival Cytology. The endodontic absorbent paper point tear test (EAPPT) (Roeko Color size 30; Langenau, Germany) strip was inserted in the lower conjunctival sac and maintained in place for 60

seconds. The moistened part was immediately measured with a digital caliper (Mitutoyo) (Fig. 1B).

For applanation tonometry, IOP was measured with a TonoPen XL (Reichert Technologies, New York, NY USA). Before the test, an anesthetic, 0.5% proxymethacaine, 1 drop topically (Anestalcon;



FIGURE 1. Selected ophthalmic tests performed on blue-fronted amazon parrot (*A. aestiva*) and orange-winged Amazon parrot (*A. amazonica*). (A) Phenol red thread test in *A. amazonica*. (B) Endodontic paper point tear test in *A. aestiva*. (C) Corneal touch threshold in *A. aestiva*.

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