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International Scientific and Professional
Seminar on Exotic Animals

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Preface

It is a pleasure to present the *Animalia Exotica 2025 Book of Abstracts*, published on the occasion of the annual scientific and professional seminar dedicated to the care of exotic animals worldwide. This event brings together researchers, professionals, and students united by a shared interest in veterinary medicine, biology, welfare, and conservation of species beyond the familiar.

The mission of *Animalia Exotica* is to foster dialogue and collaboration among specialists in veterinary medicine, biology, and related fields, and to promote the exchange of knowledge and experience in exotic animal science.

All abstracts included in this publication have been reviewed by an **International Scientific Committee**, ensuring the academic quality of the presented work. The Organising Committee expresses its gratitude to all authors, reviewers, and editors for their valuable contributions and commitment.

We hope that this Book of Abstracts will serve as a useful reference and inspiration for future research and collaboration in this diverse and evolving field.

On behalf of the Organising and Scientific Committee,
Seven Mustafa and Iliana Ruzhanova-Gospodinova
Editors-in-Chief, Animalia Exotica 2025

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ORAL PRESENTATIONS

The following abstracts correspond to oral presentations delivered during the scientific sessions of Animalia Exotica 2025. Each contribution was reviewed and accepted by the International Scientific Committee. The lectures reflect a broad range of topics within exotic animal medicine, biology, and conservation, highlighting the diversity of research and professional practice presented at the seminar.

Assessment of oxidative stress and DNA damage induced by endoscopy under general anesthesia in red-eared sliders (*Trachemys scripta elegans*)

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Endoscopy is an important diagnostic tool in reptile medicine, but its use in turtles requires general anesthesia. Although different anesthetic protocols are applied in practice, data on their risks and side effects remain scarce. This study evaluated the effects of endoscopy and three anesthetic protocols on oxidative stress markers and DNA integrity in red-eared sliders (*Trachemys scripta elegans*). Thirty-six clinically healthy turtles (24 females, 12 males; 1.2–2.0 kg) were randomly assigned to six groups (n = 6). Each protocol was applied to two groups: one underwent endoscopy, while the other received only a clinical examination to mimic handling. Protocols included: (1) propofol 10 mg/kg + isoflurane 3 %; (2) ketamine 20 mg/kg + medetomidine 0.2 mg/kg; and (3) ketamine 10 mg/kg + medetomidine 0.1 mg/kg + isoflurane 3 %. Blood was collected from the plexus subcarapacialis 24 h before and 3 h after anesthesia.

Catalase activity was measured spectrophotometrically by hydrogen peroxide decomposition, superoxide dismutase by inhibition of epinephrine autoxidation, glutathione S-transferase

using 1-chloro-2,4-dinitrobenzene as substrate, and malondialdehyde by TBARS assay. DNA damage was evaluated with the alkaline comet assay.

All protocols induced significant changes in oxidative stress, with distinct patterns observed in both endoscopy and non-endoscopy groups. SOD activity decreased with the ketamine – medetomidine – isoflurane protocol, while CAT showed the greatest reduction with propofol – isoflurane. GST activity increased with propofol – isoflurane but decreased with ketamine – medetomidine. MDA levels rose after propofol – isoflurane and ketamine – medetomidine but remained stable with ketamine – medetomidine – isoflurane. Endoscopy itself did not exert an additional effect, and no DNA damage was detected in any group.

These findings demonstrate protocol – dependent oxidative stress alterations in turtles, with the ketamine – medetomidine protocol having the lowest overall impact, supporting the safe use of celioscopy with appropriate anesthetic selection.

Part of this data has been published previously (DOI: 10.1556/004.2020.00058).

Keywords: anaesthesia, endoscopy, DNA damage, oxidative stress, Red-eared slider

Dental disease in pet rabbits (*Oryctolagus cuniculus*): etiopathogenesis, clinical features, diagnosis, and therapeutic approaches

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Dental diseases, both congenital and acquired, are among the most common and frequently encountered health and welfare concerns in pet rabbits (*Oryctolagus cuniculus*). They represent a complex, polyetiological syndrome with a wide variety of clinical manifestations. Primary etiological factors include congenital and developmental abnormalities, trauma, inadequate nutrition resulting in insufficient tooth wear, and metabolic bone disease leading to osteopenia of the alveolar bones.

Clinical signs of dental disease may vary, and in its early stages the syndrome can remain latent. The most common manifestations include weight loss, reluctance to consume abrasive food, hypersalivation, epiphora, dacryocystitis, changes in fecal output, and poor general condition. When dental disease is suspected, a comprehensive diagnostic workup — including thorough dental examination under general anesthesia and appropriate imaging — is recommended. Odontogenic abscesses and osteomyelitis are common complications of dental disease, among the most difficult to manage.

Treatment is multimodal and should be individualized; it may include coronal reduction or amputation, intraoral and/or extraoral tooth extractions, with pharmaceutical therapy as an important

adjunct. The goal of treatment is to restore anatomy and function as close to physiological as possible while addressing secondary pathological changes such as infection. Preventive strategies, including nutritional correction and regular dental monitoring, remain the cornerstone of long-term management.

Keywords: dental disease, diagnostic imaging, malocclusion, odontogenic abscess, osteomyelitis, rabbit

Retrospective analysis of reptilian cases at the Faculty of Veterinary Medicine, Zagreb

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This study retrospectively analyzed reptile cases to assess disease prevalence, diagnostic approaches, and clinical outcomes. Over one-year period, 241 examinations were performed on 128 reptiles presented to the Clinic for Birds and Exotic Animals, Veterinary Teaching Hospital, University of Zagreb. The majority were lizards (53.91%), followed by chelonians (36.72%), snakes (8.59%), and one caiman (0.78%).

Wide ranges of clinical conditions were diagnosed, reflecting the complexity of reptile medicine. The most prevalent disorders included renal disease (19.53%), gastrointestinal disorders (18.75%), dermatological conditions (16.41%), and nutritional secondary hyperparathyroidism (14.06%). Additional diagnoses involved fractures, reproductive disorders, and routine health evaluation (each $\approx$ 11%). Less frequently observed conditions included hypovitaminosis A, traumatic injuries, ophthalmological and respiratory diseases (each $\approx$ 6%), internal parasitosis (5.47%), hepatic lipidosis (3.13%), neurological symptoms and neoplastic processes (2.34% each). Hospitalization was required in 42 cases (32.8%), with a total of 288 inpatient days and a mean hospitalization duration of 6.86 days.

Diagnostic tools included biochemical profiling (n=41), hematology (n=30), and radiography (n=61). Despite intensive therapeutic interventions, six animals died during hospitalization, and ten were euthanized due to poor prognosis and welfare considerations.

These findings highlight the diverse and often complex clinical presentations encountered in reptilian patients and underscore the importance of species-specific diagnostics and management. The notable proportion of animals presented for routine examinations also indicates a growing awareness of preventive veterinary care among reptile owners. This study contributes valuable insights into reptile medicine, supporting improved clinical protocols and serving as an important educational resource for veterinary professionals working with exotic species.

Keywords: Clinic, diagnosis, hospitalisations, reptiles

Between life and death. Some oral and gastrointestinal diseases for exotic pets to require emergency surgery

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Similar to dogs and cats, emergencies in exotic pets can be broken down into two categories: “acute” (resulting from a sudden, recent disease) and “chronic” (resulting from a more chronic, ongoing process).

This report describes the diagnosis, antibacterial therapy, analgesia, and surgical treatment of facial abscesses, crop fistulas, gastric and intestinal obstipation, and proventricular foreign bodies referred to the Small Animal Clinic of the University Veterinary Hospital in Stara Zagora, Bulgaria.

“Chronic” emergencies are common due to the exotic animal hiding signs of disease and the owner not being experienced enough to recognize signs of illness until the animal is in a severely debilitated condition. As a result, these conditions may be just as life-threatening as “acute” emergencies.

Treatment of oral and gastrointestinal diseases in exotic species needs to be individual and, in some cases, requires invasive surgery.

Keywords: exotic pet, surgery, emergency diseases, gastrointestinal disorders

Challenges in applying regenerative therapies to reptiles

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In recent years, regenerative medicine has found increasingly wide application in the treatment of various tissue injuries in both human and veterinary medicine. Platelet-rich plasma (PRP) has been established as a promising biological therapy used to stimulate regenerative processes and accelerate the recovery of damaged tissues. Despite its successful application in humans and mammals within veterinary medicine, the use of PRP in reptiles remains poorly studied and is associated with a number of challenges.

A major challenge lies in the different hematological physiology of reptiles – their thrombocytes have distinct morphology and functions compared to those of mammals, which complicates the standardization of methods for PRP preparation and dosage. The lack of validated protocols, limited data on long-term efficacy, and the difficulties in obtaining sufficient blood volumes from reptiles further hinder the use of PRP.

Despite these limitations, the regenerative potential of PRP in reptiles is considerable and warrants in-depth studies to optimize methodologies and determine its biological effects across different reptile species.

Keywords: PRP, reptiles, thrombocytes, challenges

Dental disease in guinea pigs, or why guinea pigs should not be considered ‘small rabbits’

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Guinea pigs are herbivorous rodents (simplicidentata, i.e. lacking peg teeth). Their dental formula is I 1/1, C 0/0, P 1/1, M 3/3, a total of 20 teeth. The incisors and cheek teeth are all aradicular (no real root) and elodont (continuously growing). The mandible is wider than the maxilla (anisognath) and the cheek teeth occlude in a 40° angle (in rostro-caudal aspect). The mesial surface in guinea pigs is almost smooth, unlike that in rabbits, which have a zig-zag pattern (in lateral aspect). Overall, the oral cavity of guinea pigs is narrower than rabbits, which makes dental trimming more challenging and iatrogenic damage to soft tissues more likely. To prevent tooth overgrowth and subsequent dental disease, they need to gnaw and chew on long fibrous materials (grass and hay).

Dental disease in guinea pigs can be congenital, such as macrodontia, or acquired. Acquired dental disease (ADD) may be a) primary, such as tooth overgrowth caused by a lack of dietary fiber and vitamin C; or b) secondary to other medical conditions, e.g. gonarthrosis, causing pain and hyporexia or anorexia, thus reducing dental wear. This can lead to cheek teeth ‘bridging’ with tongue entrapment, dental malocclusion, facial abscesses, and temporomandibular subluxation.

Signs of dental disease include anorexia, weight loss, (hyper)salivation, facial swelling, soft feces, or lack of defecation.

Apart from a thorough patient history, a complete clinical exam should be conducted. The skull should be palpated and the oral cavity inspected with an otoscope or oral speculum. Radiography, endoscopy, and CT-scan aid in diagnosing dental disease. Treatment options may include dietary modification (adding more hay and vitamin C), dental trimming (with a diamond drill), apicectomy, and or facial abscess surgeries.

ADD in guinea pigs is likely multi-factorial, with various symptoms similar to those in rabbits. However, the guinea pig's unique dental anatomy and mastication (chewing) process cause different clinical pictures. Hence, a different approach to treatment.

Despite a successful diagnosis, the prognosis in guinea pigs is guarded. Often, ADD is quite advanced before it's diagnosed. Even if normal occlusion is restored, treatment may be unsuccessful, and euthanasia should be considered. If the underlying cause is not addressed, the problem will recur in 4 to 6 weeks. Treatment success highly depends on the veterinarian's experience and owner's compliance.

Keywords: Acquired dental disease, dental anatomy, guinea pig, treatment

Morphometry of blood cells in amphibians and reptiles

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The structure and function of blood cells may be influenced by a variety of physiological, environmental (e.g., radiofrequency electromagnetic radiation), and pathological factors. Even minor morphological alterations can impair cellular activity, which is why recognition of species-, sex-, and age-related differences is crucial for accurate diagnostic interpretation.

Morphometry, as a fundamental approach in image cytometry, allows quantitative evaluation of cells and tissues by measuring distinct structural features and presenting them in two-dimensional form. Such analysis makes it possible to detect subtle abnormalities and to classify cells into defined groups or subpopulations by applying statistical and multivariate methods, including principal component and cluster analysis.

Erythrocytes are particularly sensitive to adverse conditions, and their morphology varies greatly among vertebrate species. While mammalian red blood cells lack nuclei, in reptiles and amphibians they remain nucleated and differ considerably in size and shape. Conventional morphometric studies relied mainly on linear measurements taken with ocular or stage micrometers. The

introduction of computer-assisted image analysis has markedly improved accuracy and reproducibility, enabling the detection of minor variations invisible to the human eye.

Systems such as SFORM (VAMSTEC, Zagreb, Croatia), combined with high-resolution microscopy and standardized staining (May–Grünwald and Giemsa), allow precise determination of cell size indicators: area, outline, convex, minimal and maximal radius, length and breadth, as well as calculation of derived shape parameters including: ellipticity, elongation, solidity, form factor, contour index.

Although still relatively new in reptile and amphibian medicine, morphometry shows considerable promise as a tool for health monitoring, disease prognosis, and diagnostic evaluation. Establishing reliable baseline values across species and under different physiological or pathological conditions will further expand its clinical and research potential.

Keywords: amphibians, erythrocytes, morphometry, reptiles, veterinary hematology

Characteristics of lizard blood cells

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The invited lecture will highlight the importance of hematological evaluation in reptiles, with special emphasis on the role of differential blood counts in the diagnosis of diseases. Lizards will be presented as a diverse group showing considerable variation in blood cell morphology and proportions, which has direct relevance for clinical interpretation. The lecture will provide an overview of erythrocytes, leukocytes, and thrombocytes in lizards, with attention to their general features rather than detailed morphology. Particular focus will be placed on the diagnostic value of leukocyte profiles, since changes in lymphocytes, heterophils, or other white blood cells may indicate infection, inflammation, stress, or parasitic burden.

Examples from different lizard species will illustrate how these variations reflect both physiological adaptations and responses to disease. The occurrence of hemoparasites in free-ranging lizards will also be briefly addressed as a common and clinically important finding. In conclusion, the lecture will underline the relevance of blood cell assessment in lizards for advancing reptile medicine and improving diagnostic approaches in exotic animal practice.

Keywords: lizards, hematology, differential blood count, diagnostics, reptiles

Mastering rabbit anesthesia: From basics to clinical practice

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Anesthesia in pet rabbits represents a true clinical challenge due to their unique physiology, high perioperative risk, and sensitivity to stress. This article aims to provide a practical overview of anesthesia in rabbits, focusing on the critical stages that ensure patient safety and optimal outcomes.

We discuss key components of the anesthetic process, including pre-anesthetic assessment and preparation, induction protocols using balanced drug combinations, airway management with special emphasis on intubation techniques, and safe recovery strategies. Different anesthetic approaches are presented depending on the type of surgical procedure and anticipated pain level – a combination between α_2 -agonists and dissociative agents; α_2 -agonists with opioids, ataractics and dissociative agents; propofol and isoflurane, and more.

Four anesthetic protocols commonly used in rabbit practice are presented and compared, highlighting their main advantages, disadvantages, and clinical indications. Practical recommendations are provided for tailoring anesthesia to individual patients, improving monitoring, and minimizing intra- and postoperative complications.

A structured, patient-oriented anesthetic approach, from preparation and induction to recovery, is essential for improving

outcomes in rabbit anesthesia. Understanding the strengths and limitations of different protocols, combined with careful perioperative care, significantly enhances safety and welfare in these highly sensitive patients.

Keywords: rabbit, anesthesia, intubation, surgery

Diagnostic methods for behavioral disorders in game and domestic birds

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Harmful behavior in game and domestic birds is not always easy to diagnose, but numerous methods can be described in the scientific literature. The most commonly used method is behavioral diagnostics, with the aim of differentiating the individual forms of injurious pecking in the studied birds. It involves creating ethograms using computer software to analyze the data obtained. Clinical diagnosis includes scales for assessing the damage caused to the victim's plumage and skin. Clinical tests are used to determine the fear-provoking stress response in the birds being tested. These are: tonic immobility test, manual restraint test, novel object test, stationary person test and novel environment test. Laboratory methods include determining the concentrations of corticosterone, noradrenaline, serotonin and dopamine in the blood of birds. Immunological tests to determine the ability to produce antibodies and a change in the ratio of heterophils to lymphocytes. Another group of methods is also used in practice regarding food intake related to cannibalism, leading to the negative energy balance of birds. These include determining the feed conversion ratio and residual feed consumption. This review aims to summarize and present all methods available in science and practice for diagnosing behavioral disorders in birds.

Keywords: cannibalism, corticosterone, feather pecking, neurotransmitters, stress

Inside the serpent: Lessons from celiomic surgery in snakes

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Surgical procedures involving the celomic cavity of snakes present unique anatomical and physiological challenges. Unlike mammals, snakes lack a diaphragm, resulting in a single celomic cavity that contains all major visceral organs, closely packed and often overlapping. This anatomical configuration, combined with temperature-dependent metabolism and species variability, complicates anesthesia, surgical access, and postoperative recovery.

This presentation summarizes six clinical cases of celiotomy performed in captive snakes, including foreign body removal from the stomach (1 common boa), intestinal resection (1 common boa, 1 corn snake), treatment of intraluminal formations (1 corn snake), and surgical management of retained eggs (1 ball python, 1 corn snake). Each case highlights key aspects of preoperative stabilization, anesthesia, surgical technique, and postoperative care.

Emphasis is placed on maintaining thermoregulation and hydration, ensuring effective ventilation during anesthesia, minimizing tissue trauma, and optimizing wound healing. The discussion outlines common complications, lessons learned, and practical strategies to improve clinical outcomes in reptile surgery.

Understanding the specific anatomical and physiological characteristics of snakes is essential for achieving successful celiotomy results and recovery. This experience-based overview aims to assist clinicians in approaching snake surgery with greater confidence and precision.

Keywords: snake, serpents, celiotomy, anesthesia, surgery, gastrointestinal surgery

POSTER PRESENTATIONS

*The Poster Session of Animalia Exotica 2025 is proudly supported by the **Faculty of Veterinary Medicine, University of Forestry, Sofia**. The session provides an open platform for students, researchers, and professionals to present original studies, case reports, and innovative observations in the field of exotic animal science. The Organising Committee acknowledges the University's contribution to promoting young scientists and encouraging active participation in research and education.*



**Manuka honey-based treatment of bilateral
pododermatitis in a captive Grey crowned crane
(*Balearica regulorum*)**

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A 1-year-old male Grey Crowned Crane (*Balearica regulorum*) presented with pododermatitis, characterized by mild to moderate soft tissue swelling, epidermal hyperkeratosis, and superficial erosions on the plantar surfaces of both feet. The condition was attributed to chronic exposure to hard substrate and reduced mobility associated with a suboptimal captive environment under previous ownership.

A conservative, non-invasive wound management protocol was initiated using medical-grade manuka honey (Activon®), Actilite® (a non-adherent mesh dressing impregnated with manuka honey and oils), and Advazorb® hydrophilic foam dressings, all developed for human wound care. Weekly treatment sessions included wound lavage with sterile saline, gentle cleansing with a dilute povidone-iodine solution to reduce microbial burden, and direct application of manuka honey. Dressings were applied to maintain a moist, antimicrobial environment and provide pressure redistribution. The feet were then wrapped with sterile gauze and secured using cohesive bandages, ensuring stability without vascular compromise.

Progressive clinical improvement was observed, including reduced inflammation, healthy granulation tissue formation, and improved weight-bearing by week three. Complete resolution of lesions was achieved by week five, with no recurrence during a two-month follow-up period. Preventive measures, including soft substrate (chopped straw) and increased enclosure space to encourage natural behavior and movement, were implemented to minimize recurrence risk.

This case demonstrates the effectiveness of a manuka honey-based wound care protocol and environmental modification, in managing pododermatitis in a captive avian species. A limitation of this study is that it is a single case report, and further investigation involving a larger sample size is needed to generalize outcomes.

Keywords: *Balearica regulorum*, manuka honey, pododermatitis, treatment, Grey crowned crane

Histological tissue preparation in reptiles: practical aspects and challenges

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In recent decades, the popularity of reptiles as companion animals has steadily increased worldwide. This trend has led to a growing demand for knowledge about their anatomy, physiology and health. Consequently, research on reptilian morphology has increased, providing insights relevant to veterinary medicine, comparative studies and the advancement of welfare and conservation.

The aim of this study was to highlight the methodological challenges of histological processing and microscopic analysis of reptilian tissues. Tissue processing for histology involves several key steps including sampling, fixation, dehydration, clearing, paraffin embedding, microtome sectioning and staining with specific dyes depending on the structures of interest. Each of these steps may influence the final quality of sections and the ability to observe tissue structure accurately. Histological preparation of

reptile tissues is demanding due to their small body size and anatomical variability.

These challenges require precise dissection, careful adjustment of fixation and dehydration protocols, stabilization of delicate samples, and in some cases, decalcification before sectioning. Microscopic analysis is also specific, as available reference data for reptiles are scarce, making interpretation more complex. This study contributes to the limited knowledge of reptilian histology and provides a basis for future research in anatomy, veterinary medicine and conservation.

Keywords: reptiles, histology, tissue processing, methodology, challenges

Tail regeneration in Cuvier's dwarf caiman (*Paleosuchus palpebrosus*): A case report

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Among reptiles, tail regeneration is a well-known phenomenon, especially in lizards, while recent work has shown that even young American alligators can partially restore lost caudal tissue. In contrast, there is very limited information on this process in caimans.

Here we describe an accidental tail injury and subsequent regrowth in a captive female Cuvier's dwarf caiman (*Paleosuchus palpebrosus*) kept at the Faculty of Veterinary Medicine, University of Zagreb. The animal, seven years old and fed mainly on chicks, was housed in a terrarium–aquarium with a heated glass platform covered by a non-slip surface. At the onset of warmer weather, the caiman appears to have trapped her tail between the heating platform and the glass wall. The distal tip of the tail was later found at the bottom of the aquarium. The transection line was unusually clean, resembling a surgical cut, with no bleeding observed. Importantly, the animal showed normal behaviour and appetite, and the wound healed without signs of infection.

During the following months, gradual regrowth of the tail was recorded. After nearly five months, the regenerated portion reached

about 1.5 cm. The new tissue was clearly distinct from the original structure and, much like in alligators, appeared to lack the complex musculature of the intact tail.

Although the extent of regrowth was limited, this case demonstrates that *P. palpebrosus* has at least some regenerative ability. To our knowledge, reports of tail regeneration in caimans are extremely rare, and this case highlights the need for further comparative studies across Crocodylia. Such observations may also contribute to a broader understanding of how regenerative processes evolved in archosaurs and what implications they might hold for biomedical research on tissue repair.

Keywords: *Paleosuchus palpebrosus*, tail regeneration, caiman, Crocodylia, wound healing

Pigeon paramyxovirus type 1 (PPMV-1) infection in a rock pigeon (*Columba livia*): Case description and supportive management

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The rock pigeon (*Columba livia*) is a widely distributed avian species belonging to the family Columbidae. Domesticated and feral populations are found worldwide, having successfully adapted to diverse urban and rural environments that mimic their natural habitats. These birds also serve as hosts to a variety of viral, bacterial, and parasitic pathogens, playing an important role in the epidemiology of avian diseases by acting as reservoirs and potential sources of transmission. Among the most significant viral infections in pigeons is pigeon paramyxovirus type 1 (PPMV-1), a variant of *Avian orthoavulavirus-1* (previously *Avian paramyxovirus-1*), the causative agent of Newcastle disease in poultry. The infection manifests primarily with neurological and gastrointestinal symptoms, and transmission occurs mainly through ingestion or inhalation of contaminated feces or secretions.

This case report describes an adult pigeon (*C. livia*) presented with acute lethargy, anorexia, green diarrhea, ataxia, and torticollis. Based on available scientific literature describing supportive management of viral infections in pigeons and other avian species, a treatment plan was formulated. Symptomatic therapy, including fluid administration, assisted feeding, multivitamin supplementation, broad-spectrum antibiotics to prevent secondary bacterial infections, and low-dose fenbendazole for suspected parasitism—was applied to manage the disease progression.

Therapy effectiveness was assessed through clinical improvement and post-treatment RT-PCR and serology results.

Early and comprehensive supportive care can facilitate survival and partial neurological recovery following acute PPMV-1 infection. Residual neurological deficits likely reflect irreversible neuronal injury. Fenbendazole should be used cautiously due to its dose-dependent toxicity in pigeons. Survivors may remain intermittent carriers, underscoring the importance of isolation and biosecurity in managing PPMV-1 outbreaks.

Keywords: *Columba livia*, pigeon paramyxovirus type 1, supportive care, neurological recovery, biosecurity

From rooftops to parks: The physiology and ecology of bees in urban landscapes

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In the last decades, the urban landscapes were recognized as complex ecosystems supporting pollinator diversity and services. Nevertheless, the bees inhabiting these environments face distinct ecological pressures. This includes fragmented forage, pollution, and microclimatic stress. The presented educational module developed within the framework of the *BeeUrban – Buzzing Futures: Enhancing Entrepreneurship Skills and Competences in Urban Beekeeping* integrates current scientific knowledge on bee anatomy, physiology, and behaviour to build foundational understanding among urban stakeholders. This crucial module explains how morphological and physiological traits, such as proboscis length, corbiculae, sensory adaptations, and fat body function, underpin bees' foraging efficiency, navigation, and resilience, and it further explores colony dynamics and communication mechanisms, including pheromonal signaling and the waggle dance, connecting these behaviours to collective decision-making in resource-limited urban contexts.

The ecological role of bees in maintaining pollination networks within cities was emphasized and the strategies to enhance urban habitats, such as ensuring floral continuity, nesting resources, and ecological connectivity were highlighted. Developed as part of an interactive training framework, the material combines scientific

synthesis with practical guidance. By bridging together the entomology, ecology, and urban design, this initiative enhances public and professional awareness of bee biology and underscores the need for integrated conservation planning. The module thus contributes to developing bee-urban communities capable of fostering resilient pollinator populations across anthropogenic landscapes.

Keywords: urban ecology, honeybee biology, pollinator conservation, environmental education, sustainable apiculture

Veterinary and ecological perspectives in managing urban bee health

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The expansion of urban beekeeping introduces various opportunities and challenges for pollinator health. This highlights the need for evidence-based management that balances productivity, welfare, and environmental sustainability. The presented module-developed under the *BeeUrban – Buzzing Futures: Enhancing Entrepreneurship Skills and Competences in Urban Beekeeping* project focuses on pest and disease control in urban hives through an environmentally conscious, One Health–aligned framework, as the purpose was to bring together current research on the biology, transmission, and impacts of major threats. This includes not only the Varroa destructor, small hive beetles (*Aethina tumida*), wax moths (*Galleria mellonella*), but also the urban nuisances such as ants, rodents, and vandalism.

Integrated Pest Management (IPM) principles adapted to city contexts were noted, prioritizing monitoring, mechanical and biological interventions, so as the use of organic compounds (formic acid, oxalic acid, thymol). Details on disease recognition and prevention, focusing on American and European foulbrood, Nosema infections, chalkbrood, and viral complexes, with guidance on inspection, hygiene, and diagnostic tools were included. An interesting rooftop case study demonstrates IPM implementation reducing mite loads while preserving colony

health and minimizing chemical exposure. The module integrates veterinary, ecological, and practical perspectives to enhance the competencies of beekeepers and professionals required for sustainable hive care. Through interactive materials, infographics, and a self-assessment test, it contributes to capacity building in pollinator health management and strengthens collaboration between ecological and veterinary disciplines to safeguard bee populations in urban environments.

Keywords: honeybee health, disease prevention, urban beekeeping, veterinary care, biosecurity

Respiratory tract infection in a ball python (*Python regius*): Diagnostic and therapeutic challenges

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The present clinical case describes the diagnostic approach and therapeutic management of a respiratory tract infection in a 3-year-old male Ball python (*Python regius*). The animal was presented with respiratory noises, oral mucus discharge, and anorexia. Clinical examination revealed open-mouth breathing and increased respiratory effort. Tracheal lavage was performed, and samples were subjected to microbiological culture, antibiotic susceptibility testing, and polymerase chain reaction (PCR) analysis. The results indicated a mixed infection with *Pseudomonas aeruginosa* and Reovirus.

Therapeutic management included systemic and local antimicrobial therapy administered orally, intramuscularly, and via inhalation. Supportive care consisted of vitamin supplementation, anti-inflammatory medication, and optimization of environmental parameters (temperature and humidity). Despite periods of partial clinical improvement, the animal's condition exhibited recurrent relapses over a ten-month period, ultimately resulting in death.

Post-mortem examination revealed severe pulmonary consolidation with accumulation of thick, yellowish, caseous exudate filling the airways and lungs, consistent with chronic bacterial pneumonia. The case highlights the complexity of diagnosing and managing respiratory disease in reptiles, particularly when viral and bacterial pathogens coexist. The

chronic course and poor therapeutic response underscore the importance of early, targeted antimicrobial therapy, rigorous environmental control, and comprehensive diagnostic testing – including viral screening. This report contributes to the understanding of multifactorial respiratory infections in pythons and emphasizes the need for integrative diagnostic and therapeutic strategies in exotic animal medicine.

Keywords: respiratory tract infection, ball python, PCR, reovirus, antibiotic therapy

Incisors malocclusion in pet rabbits – a review

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Incisor malocclusion is one of the most common dental pathologies encountered in domestic rabbits (*Oryctolagus cuniculus*). As lagomorph teeth are aradicular hypsodont and grow continuously throughout the life of the animal, even minor disturbances in normal occlusal wear can result in progressive deformity, discomfort, and systemic complications. This study outlines the anatomy, etiopathogenesis, clinical manifestations, treatment options, and preventive strategies for incisor malocclusion, emphasizing the significance of diet, genetics, and surgical precision in long-term management.

Anatomical and radiographic assessments were used to illustrate the relationships between normal and pathological tooth alignment. Clinical data highlights the diagnostic value of imaging techniques, occlusal correction procedures, and incisor extraction protocols. Malocclusion may develop due to congenital mandibular prognathism, insufficient dietary fiber intake, metabolic bone disease, trauma, or secondary premolar and molar pathology. Common clinical signs include anorexia, hypersalivation, facial deformity, ocular discharge, and weight loss. Conservative management through periodic tooth trimming provides only temporary relief, whereas complete incisor extraction represents a definitive and often curative treatment. Rabbits generally adapt well postoperatively, using their lips and tongue effectively for prehension and mastication.

Preventive measures, such as providing a hay-based diet, gnawing enrichment, genetic selection, and regular dental examinations-are essential. Incisor malocclusion is a preventable and treatable disorder; early diagnosis, appropriate surgical intervention, and lifelong nutritional management are crucial for restoring normal function and ensuring optimal welfare in pet rabbits.

Keywords: incisor malocclusion, dentistry, rabbit, tooth extraction, animal welfare

Common household items toxic to parrots: Hidden dangers in domestic environments and their impact on avian health

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Parrots represent one of the most toxin-sensitive groups of companion animals, owing to their unique respiratory anatomy, elevated metabolic rate, and inquisitive behavioral tendencies. Even minimal exposure to airborne pollutants or ingestion of toxic substances can precipitate acute respiratory distress, hepatic or neurological dysfunction, and, in severe cases, death. This review highlights common household toxicants that pose substantial risk to parrots, including polytetrafluoroethylene (PTFE or Teflon), essential oils and fragranced products, moisture absorber boxes, and objects containing heavy metals such as zinc or lead.

Overheating of PTFE-coated cookware and appliances releases odorless pyrolysis gases that can cause fatal pulmonary hemorrhage within minutes. Volatile organic compounds (VOCs) emitted from essential oils and scented agents provoke respiratory irritation and may contribute to hepatic and neurological impairment. Calcium chloride-based desiccants may induce caustic burns or electrolyte disturbances upon ingestion or dermal contact and respiratory distress upon inhalation. Heavy-metal intoxication, particularly from zinc and lead, results in multisystemic toxicity necessitating chelation therapy and prolonged supportive care.

Rapid recognition of clinical manifestations – including dyspnea, lethargy, seizures, or changes in droppings - is critical to prognosis. Early intervention with oxygen supplementation, anti-inflammatory agents, and fluid therapy may be lifesaving.

Ultimately, prevention remains the most effective approach: minimizing exposure to hazardous materials, ensuring adequate ventilation, and utilizing avian-safe alternatives such as stainless-steel cookware and VOC-free cleaning products.

This overview underscores the necessity for heightened awareness among veterinarians and pet owners to mitigate preventable toxic exposures in domestic environments shared with parrots.

Keywords: parrots, household toxins, PTFE toxicosis, heavy metal poisoning, calcium chloride, avian health, environmental exposure

Greek wildlife rescue network: Response, rescue, search missions, care and aftermath of the 2025 wildfires

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Each year, Greek wildlife faces one of its most severe environmental threats – wildfires. These catastrophic events have destroyed thousands of hectares of forest, causing extensive habitat loss and severely affecting native wildlife populations, as well as farm and stray animals. In response to these recurring crises, ANIMA (Hellenic Wildlife Care Association) and SAVE YOUR HOOD (environmental organization) have collaborated to establish the Wildlife Rescue Network – Greece (W.R.N.–Greece). This network is supported by trained rescuers and wildlife veterinarians, ensuring rapid and coordinated intervention during emergencies.

The present study outlines standardized rescue protocols, first aid procedures, and therapeutic approaches for first-, second-, and third-degree burns in wild species. Initial treatment included wound decontamination with chlorhexidine solution, followed by topical application of silver sulfadiazine to prevent infection and promote healing. In severe cases, enrofloxacin and meloxicam were administered at species-specific dosages. Long-term rehabilitation included fluid therapy, nutritional support, and controlled environmental conditions to facilitate shell regeneration and overall recovery.

A statistical assessment of wildlife affected by the 2025 wildfires revealed a total of 647 animals found, of which 157 were alive and well, 448 were deceased, and 48 were rescued and treated. The

majority of cases involved tortoises (*Testudo marginata* and *Testudo hermanni*, n=498), followed by toads (*Bufo bufo*, n=43), lizards (*Ablepharus* spp., *Lacerta* spp., n=33), and snakes (*Vipera ammodytes*, *Malpolon insignitus*, *Dolichophis caspius*, n=26).

These results highlight the vital role of organized wildlife rescue efforts and intersectoral cooperation in mitigating the effects of wildfires on Greece's biodiversity.

Keywords: wildfires, rescue, wildlife, first aid, treatments, biostatistics, Greece

The silent spread: Pathogens shared between rabbits and guinea pigs

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Interspecies transmission of pathogens between domestic rabbits (*Oryctolagus cuniculus domesticus*) and guinea pigs (*Cavia porcellus*) represents a significant health concern in both pet and laboratory environments. This report investigates bacterial agents primarily responsible for cross-species respiratory infections, focusing on *Bordetella bronchiseptica*, *Pasteurella multocida*, and *Mannheimia (Pasteurella) haemolytica*.

Rabbits often act as asymptomatic carriers, transmitting these organisms via aerosols, direct contact, or contaminated fomites to highly susceptible guinea pigs, in which infection can result in pneumonia, otitis media, and septicemia. The report includes a documented case of chronic respiratory disease and ear infection in a 4-year-old male guinea pig (800 g) co-housed with a free-range, clinically healthy rabbit. Clinical signs included coughing, sneezing, anorexia, dyspnea, and nasal discharge, with no neurological or vestibular signs, but with marked pain upon palpation of the mandibular and affected ear region.

Bacterial culture of tympanic exudate confirmed the presence of *Bordetella bronchiseptica* and *Pasteurella multocida*. Surgical management consisted of a myringotomy with endoscopic evacuation of purulent material under combined ketamine–midazolam anesthesia. Postoperative therapy included systemic antibiotics, aerosol therapy, and vitamin C supplementation.

Laboratory cultivation characteristics and morphological findings of *Mannheimia haemolytica* are also discussed, emphasizing its potential role in mixed respiratory infections.

Preventive recommendations highlight the importance of housing rabbits and guinea pigs separately, maintaining strict hygiene, and minimizing cross-species contact to prevent pathogen transmission. These findings underscore the need for clinical vigilance and early diagnosis when different small mammal species are kept together.

Keywords: rabbits, guinea pigs, *Bordetella bronchiseptica*, *Pasteurella multocida*, *Mannheimia haemolytica*, interspecies transmission, respiratory infection

Vitamin A deficiency in captive reptiles: A preventable condition

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Hypovitaminosis A, or vitamin A (retinol) deficiency, is a common nutritional disorder in insectivorous reptiles, most often resulting from inadequate dietary intake, improper feeding practices in captivity, or metabolic dysfunctions. Species most frequently affected include turtles, geckos, chameleons, and other insectivorous reptiles. Vitamin A plays an important role in maintaining normal epithelial tissues and is vital for vision, growth, reproduction, and immune function.

Clinically, vitamin A deficiency manifests as squamous cell metaplasia and hyperkeratosis of the respiratory and ocular epithelia, aural abscesses, blepharodema, carapace desquamation, poor shedding, among other signs. Diagnosis is primarily based on dietary history combined with clinical presentation. Treatment is typically prolonged and begins with the management of any secondary complications. The primary therapeutic approach involves carefully administered vitamin A supplementation – either enterally or parenterally – while closely monitoring to avoid iatrogenic hypervitaminosis A.

Although supplementation alone may not immediately resolve all clinical signs, it provides essential support for recovery. The overall success and duration of healing depend significantly on consistent nutritional management and the maintenance of optimal

environmental conditions. Vitamin A deficiency should be closely monitored to prolong the quality of life in these species.

Keywords: captivity, diet, Hypovitaminosis A, insectivores, reptiles

Microbiological study of pododermatitis in captive Asian elephants (*Elephas maximus*)

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Pododermatitis is a frequent condition in captive elephants, often resulting from limited movement, inappropriate flooring, and moisture accumulation, combined with lesions on the nails. The disease can lead to chronic pain and disability, thus posing a major welfare concern. The objective of this study was to identify microorganisms associated with foot lesions in captive Asian elephants and to evaluate the influence of environmental and management factors on their occurrence. Samples were collected from four Asian elephants (*Elephas maximus*). Two females housed in Sofia Zoo, Bulgaria, and two males housed in Attica Zoological Park, Greece. Twelve samples in total (three of each elephant) were obtained from under the nails, between the toes, and from foot lesions. Microbiological examinations were performed using elective and selective culture media under aerobic and anaerobic conditions, followed by microscopic and biochemical identification of bacterial and fungal isolates.

The elephants in Sofia Zoo harbored *Serratia marcescens*, *Hafnia alvei* 2, *Staphylococcus warneri*, *Staphylococcus simulans*, and *Cryptococcus neoformans*. In contrast, samples from the elephants

in Attica Zoological Park revealed higher microbial diversity, including *Citrobacter freundii*, *Enterobacter agglomerans* 3, *Staphylococcus cohnii* ssp. *urealyticum*, *Staphylococcus mucilaginosus*, *Staphylococcus warneri* 1, *Corynebacterium* sp., *Candida glabrata*, and *Microsporium* sp. Despite microbial presence, no clinical signs of inflammation were detected, likely due to consistent hygiene and nail care practices. Environmental conditions and husbandry practices significantly influence the microflora of elephant feet. Regular cleaning, trimming, and microbiological monitoring play a vital role in preventing pododermatitis and ensuring the health and welfare of captive elephants.

Keywords: Asian elephant, zoo, captivity, foot health, microbiology, pododermatitis

Endoparasitic status of pet lizards in Bulgaria: A 2025 survey

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This study reports on the presence of intestinal parasites in captive pet lizards from different families and species in Bulgaria, based on coprological examinations. A total of 234 fecal samples were obtained from 31 species of lizards kept in private collections, pet shops, and veterinary clinics. Samples originated from 20 cities across Bulgaria (mainly Sofia and Plovdiv) and were examined at the Scientific and Educational Parasitology Laboratory, Faculty of Veterinary Medicine, University of Forestry – Sofia, during the period January–May 2025.

Diagnostic analysis was conducted using standard ovoscopic techniques, including flotation methods. The overall prevalence of intestinal parasites was 38%, with positive cases showing Pharyngodonidae (Oxyurida) spp. eggs (78%), *Isospora* spp. oocysts (12%), *Eimeria* spp. oocysts (1%), and mixed infections (9%). No evident correlation was found between infection rates and lizard species or husbandry conditions, although some influencing factors were observed.

Parasite-free results were recorded for Yellow-spotted monitors, Gila monsters, Jackson's chameleons, Mangrove monitors, Chinese water dragons, Wheeler's knobtail geckos, Madagascar day geckos, Eastern blue-tongue lizards, Gargoyle geckos, Fiji banded iguanas, Red tegus, Moroccan spiny-tailed lizards, and Sakishima grass lizards. However, this finding likely reflects the

limited number of individuals tested for these less common species, representing a major limiting factor of the study. As expected, the highest infection rates were observed among the most common pet lizards – Bearded dragons, Leopard geckos, and Veiled chameleons.

All results are presented in tabular form, broken down by species. These findings highlight the continued importance of routine parasitological screening in exotic reptiles and provide valuable baseline data for improving reptile health management practices in Bulgaria.

Keywords: lizards, endoparasites, parasitosis, coprology, ovoscopy, helminths, pinworms, coccidiosis

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