



İSTANBUL
UNIVERSITY
CERRAHPAŞA

ACTA VETERINARIA EURASIA

AVE

VOLUME 51

AVES

EISSN: 2619-905X
actavet.org/

IUC
UNIVERSITY
PRESS

ACTA VETERINARIA EURASIA

Formerly Journal of the Faculty of Veterinary Medicine İstanbul University

Editorial Management

Editor in Chief

Tülay BAKIREL

Department of Pharmacology and Toxicology, İstanbul University-
Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye
tulbakir@iuc.edu.tr

ORCID ID: 0000-0001-5805-2178

Editors

Serhat ALKAN

Department of Reproduction and Artificial Insemination, İstanbul
University-Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye
salkan@iuc.edu.tr

ORCID ID: 0000-0003-4741-1416

Atila ATEŞ

Department of Biochemistry, İstanbul University-Cerrahpaşa, Faculty of
Veterinary Medicine, İstanbul, Türkiye
atiates@iuc.edu.tr

ORCID ID: 0000-0002-9013-930X

Ali AYDIN

Department of Food Hygiene and Technology, İstanbul University-
Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye
aliaydin@iuc.edu.tr

ORCID ID: 0000-0002-4931-9843

Gülcan DEMİREL

Department of Animal Nutrition and Nutritional Diseases, İstanbul
University-Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye
gdemirel@iuc.edu.tr

ORCID ID: 0000-0002-6864-5134

Bülent EKİZ

Department of Animal Breeding and Husbandry İstanbul University-
Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye
bekiz@iuc.edu.tr

ORCID ID: 0000-0001-6458-5747

Osman Behzat Burak ESENER

Department of Histology-Embryology, İstanbul University-Cerrahpaşa,
Faculty of Veterinary Medicine, İstanbul, Türkiye
burake@iuc.edu.tr

ORCID ID: 0000-0001-9444-3598

Karlo MURATOĞLU

Department of Food Hygiene and Technology, İstanbul University-
Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye
karlomrt@iuc.edu.tr

ORCID ID: 0000-0001-8705-6813

Kerem ÖTER

Department of Parasitology, İstanbul University-Cerrahpaşa, Faculty of
Veterinary Medicine, İstanbul, Türkiye
oter@iuc.edu.tr

ORCID ID: 0000-0001-7488-5276

Özge TURNA

Department of Obstetrics and Gynecology, İstanbul University-
Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye
turnao@iuc.edu.tr

ORCID ID: 0000-0002-7638-0519

Hüseyin YILMAZ

Department of Virology, İstanbul University-Cerrahpaşa, Faculty of
Veterinary Medicine, İstanbul, Türkiye
hyilmaz@iuc.edu.tr

ORCID ID: 0000-0002-7897-2358



General Manager
İbrahim Kara

Publications Director
Deniz Kaya

Finance Coordinator
Gözde Doğan

Publications Coordinators
Nisanur Atıcı
Mert Gücün
Lütfiye Çetin
Batuhan Kara
Tabita Toprak
Şevval Akkaya

**Publications Technologies
Coordinator**
Ayça Nur Sezen

Project Assistant
Ozan Şahin

Contact Address:
Halaskargazi Mah. Halaskargazi
Cad. No: 38-66E İç Kapı No: 215
Şişli, İstanbul, Türkiye
Phone: +90 212 217 17 00
E-mail: info@avespublishing.com
Web: www.avespublishing.com

ACTA VETERINARIA EURASIA

Formerly Journal of The Faculty of Veterinary Medicine İstanbul University

Editorial and Advisory Board

Rao Zahid ABBAS

Department of Parasitology, University of Agriculture Faisalabad, Pakistan

Melih AKSOY

Department of Reproduction and Artificial Insemination, Adnan Menderes University, Aydın, Türkiye

Rizah AVDIC

University of Sarajevo, Faculty of Veterinary Medicine, Bosnia and Herzegovina

Ahmet AYDIN

Department of Toxicology, Faculty of Pharmacy, Yeditepe University, İstanbul, Türkiye

Eduardo BERRIATUA FERNANDEZ DE LARREA

Department of Animal Health Murcia, University of Murcia, Spain

Sema BİRLER

Department of Reproduction and Artificial Insemination, İstanbul University-Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye

Kamil BOSTAN

Department of Gastronomy and Culinary Arts, İstanbul Aydın University, İstanbul, Türkiye

Giuseppe CAMPANILE

Department of Obstetrics and Reproduction, In Physiopathology of Ruminants' Reproduction, University of Naples Federico, Faculty of Veterinary Medicine, Naples, Italy

Marimar Del Mar CAMPO

Department of Animal Husbandry and Food Science, Instituto Agroalimentario de Aragón-IA2, University of Zaragoza-CITA, Zaragoza, Spain

Georgios FTHENAKIS

Department of Obstetrics and Reproduction, Faculty of Veterinary Medicine, University of Thessaly, Karditsa, Greece

Anton GERILOVYCH

National Scientific Center 'Institute of Experimental and Clinical Veterinary Medicine', Kharkov, Ukraine

Mustafa HASÖKSÜZ

Department of Virology, İstanbul University-Cerrahpaşa, Faculty of Veterinary Medicine, İstanbul, Türkiye

Michael HESS

Clinic for Poultry and Fish Medicine, University of Veterinary Medicine Vienna, Vienna, Austria

Munir IQBAL

The Pirbright Institute, Avian Viral Diseases Programme, UK

Fatih Mehmet KANDEMİR

Department of Medical Biochemistry, Faculty of Medicine, Aksaray University, Aksaray, Türkiye

Kostas KOUTSOMANIS

Laboratory of Food Microbiology and Hygiene, Department of Food Science & Technology, Faculty of Agriculture, Aristotle University, 54124 Thessaloniki, Greece

Gianluca NEGLIA

Department of Veterinary Medicine, University of Naples Federico II, Naples, Italy

Gülden Zehra OMURTAG

Department of Pharmaceutical Toxicology, Faculty of Pharmacy, Medipol University, İstanbul, Türkiye

Nikos PAPAIOANNOU

Department of Pathology, Faculty of Veterinary Medicine, Aristotle University of Thessaloniki, Greece

Mark G. PAPICH

College of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA

Jurgen A. RICHT

Department of Diagnostic Medicine/Pathobiology, Kansas State University, USA

Marko SAMARDŽIJA

Department of Reproduction and Obstetrics, University of Zagreb, Faculty of Veterinary Medicine, Zagreb, Croatia
Researcher ID: AEF-0366-2022
Scopus ID: 8410731800
ORCID ID: 0000-0003-0402-3173

Kazım ŞAHİN

Department of Animal Nutrition, Faculty of Veterinary Medicine, Firat University, Elazığ, Türkiye

Adel M. TALAAT

Department of Pathobiological Sciences, School of Veterinary Medicine, University of Wisconsin—Madison, Madison, Wisconsin, USA

Altay USSENBAYEV

Kazakh National Agrarian University, Veterinary Sanitary Expertise and Hygiene, Kazakhstan

Nasko VASILEV

Department of Obstetrics, Reproduction and Reproductive Disorders, Trakia University, Faculty of Veterinary Medicine, Stara Zagora, Bulgaria

Stanimir YOTOV

Department of Obstetrics, Reproduction and Reproductive Disorders Trakia University, Faculty of Veterinary Medicine, Stara Zagora, Bulgaria

ACTA VETERINARIA EURASIA

Formerly Journal of The Faculty of Veterinary Medicine İstanbul University

About the Acta Veterinaria Eurasia

Acta Veterinaria Eurasia (Acta Vet Eurasia) is a peer-reviewed, open-access, online-only journal published by the İstanbul University-Cerrahpaşa.

Acta Veterinaria Eurasia is a continuously published journal in English. The journal has moved to continuous publication by volume from Volume 51. Rather than publishing content into three online issues per year, all articles are published into a single annual (January-December) volume which will fill throughout the year as each new article is published.

Continuous publication model allows articles to be immediately released online rather than waiting for other articles in the issue to be completed. This model enhances the visibility and accessibility of the latest developments in the field.

Journal History

As of 2018, the journal has changed its title to “Acta Veterinaria Eurasia”.

Formerly Title (2002-2017)

İstanbul Üniversitesi Veteriner Fakültesi Dergisi/Journal of Faculty of Veterinary Medicine, İstanbul University

ISSN: 0250-2836

EISSN: 2148-8320

Current Title (2018-...)

Acta Veterinaria Eurasia

EISSN: 2619-905X

Abstracting and indexing

Acta Veterinaria Eurasia is covered in the following abstracting and indexing databases;

- Web of Science-Emerging Sources Citation Index
- Web of Science- Zoological Records
- SCOPUS
- DOAJ
- EBSCO
- TUBITAK ULAKBİM TR Index
- China National Knowledge Infrastructure (CNKI)
- Embase
- Gale
- AGRIS Nutrition Abstracts and Reviews Series B:Livestock Feeds

- Nutrition and Food Database
- Parasitology Database
- Review of Medical and Veterinary Mycology
- Veterinary Bulletin
- CABI AgBiotechNet
- CABI Animal Breeding Abstracts
- CABI Animal Science Database
- CABI CAB Abstracts
- CABI Dairy Science Abstract
- CABI Helminthological Abstracts
- CABI Index Veterinarius
- CABI VetMed Resource
- CABI Poultry Abstracts
- CABI Tropical Diseases Bulletin

All content published in the journal is permanently archived in Portico.

Aims, Scope, and Audience

The Acta Veterinaria Eurasia is a journal that covers scientific and technological aspects of various fields in veterinary science. The scope of the journal includes, but is not limited to, the following related fields:

- Veterinary Basic Sciences, such as Anatomy, Histology & Embryology, Physiology, Biochemistry, and Veterinary Medicine History & Deontology
- Veterinary Preclinical Sciences, such as Pathology, Parasitology, Microbiology, Epidemiology Pharmacology & Toxicology, Virology, Aquatic Products & Diseases
- Veterinary Clinical Sciences, such as Reproduction & Artificial Insemination, Surgery, Obstetrics & Gynecology, Internal Medicine, Wildlife Diseases, and Ecology, Radiology,
- Animal Breeding and Husbandry; Animal Welfare
- Animal Nutrition and Nutritional Diseases
- Food Hygiene and Technology; Veterinary Public Health

The journal's target audience includes specialists and professionals working and interested in all disciplines of veterinary medicine.

You can find the current version of the Instructions to Authors at <https://actavet.org/en/instructions-to-authors-105>