

OBJECTIVES

Acta Scientiae Veterinariae (formerly *Arquivos da Faculdade de Veterinária UFRGS*) [vol. 1 (1973) - vol. 29 (2001)] is dedicated to publish scientific studies related to Veterinary Sciences, preferably with novel and original contents, that comprehend medical, clinical, pathological, epidemiological, surgical, immunological, diagnostic and therapeutic subjects. In this journal, particular emphasis is given to research, both experimental and clinical, aimed at protection/prevention of diseases applied to the domains of Veterinary Medicine and of its interface with Public Health.

Manuscripts focusing on retrospective studies must include a review from at least the previous ten years regarding important subjects, and must not be restricted only to description of local or regional data without establishing scientific relevance in comparison to the national or international literature.

On the other hand, it is important to emphasize that this journal does not publish manuscripts dealing with studies employing natural products research or medicinal plants and its pharmacology approach (plant chemistry, biochemistry, molecular biology and genetics, structure and bioactivities of phytochemicals).

Also, ASV does not publish research involving nutritional, dietary benefits of animal feed, nutritive values, feed evaluation, methods of conservation of nutritional value of neonatal, growing, finishing and breeding animals primarily in agriculture and food production.

Manuscripts that do not agree with the above mentioned objectives will be refused prior to peer review.

METHODOLOGY OF MANUSCRIPT EVALUATION

Manuscripts are initially to be sent for a preliminary assessment by the Editorial Board. Manuscripts that do not meet the specific publication standards defined by ASV will not be accepted. **An abstract is compulsory, with a total of 3,400 characters minimum or 3,900 characters maximum, including spaces and excluding keywords**. The abstract follows a structured mode and should be written in three sections: *Background* (a short section with 700 characters maximum, including spaces) stating importance and the study's objectives; *Materials, Methods & Results*, and *Discussion*.

Note: Author/authors (Manuscripts with 10 authors or more will not be accepted for publication in ASV). Who recently have published an article in ASV may submit another manuscript for review ONLY after the Editorial Board has issued a decision on the publication/rejection of the first article. **One or more authors of one same manuscript may publish two articles a year in ASV (review and case reports excluded).**

PRELIMINARY CONSIDERATIONS

Authors are expected to inform the Editorial Board of the presence of material that has been previously published in the submitted manuscript, in which case the previously published paper should be included as a reference therein.

Authors are fully responsible for concepts and opinions presented and discussed in all papers submitted to *Acta Scientiae Veterinariae*. All papers submitted to *Acta Scientiae Veterinariae* are to be accompanied by a letter signed by all authors as a scanned document and sent by e-mail, appointing one corresponding author. The Editorial Rules of *Acta Scientiae Veterinariae* have been defined in accordance with the instructions adopted by several journals in the field of Biomedicine. Please take extra care to ensure that your submission complies with the following style and ethical guidelines.

Authorship contributions: All people defined as author and co-authors should be qualified as such. Each author is expected to take legal responsibility for the content of the submitted paper. Authorship is acknowledged based on the substantial contribution related to the following aspects: (i) Paper design and project or data analysis and evaluation; (ii) writing or critical comments that are relevant from the intellectual standpoint; and (iii) approval of the final version to be published. The members of the research team that prepared the submitted paper and who do not fit into these criteria may be listed in the Acknowledgements section.

 **Inform ORCID number of the authors** (= link <https://orcid.org/register>) during the submission process of the manuscript. The ORCID iD icon will appear next to the names of the authors.

Note: Manuscripts containing information related to the experimental use of animals must clearly state that the studies complied with relevant professional and institutional animal welfare policies. Authors are required to inform an approval statement (process number) by an ethics committee of the institution in which the research was carried (Ethical Approval).

Summary of paper presentation requirements:

- All papers must be typed in Times New Roman font size 12 and double spaced throughout (including figure legends and references). Margins should be 2.5 cm;
- Line numbers must be exhibited on the left margin. All lines must be numbered;
- Cover-Page that includes: the full title (with no more than 60 words), complete name(s) with no abbreviations and affiliation(s) of all author(s); name and email address of the designated corresponding author (Correspondence); ABSTRACT (three sections) and a list of up to six keywords.
- **Paper sections should be ordered as follows:** Text (Do not use, sentences with "we..." or "our..." subdivided into sections = Introduction (with maximum of 1,700 characters including spaces); Materials and Methods; Results; Discussion and Conclusion(s). Sources and Manufacturers (when necessary); *Funding* (optional); *Acknowledgements* (optional); *Ethical Approval* (when necessary); *Declaration of Interest* and References.
- Supply electronic files of all figures (**Do not embed the figure in the text**). The figures must be presented in a size larger than that of the final montage for publication (which is at least 8 cm and at most 17 cm in width).
- Permission to reproduce previously published material must be included.

• **NOTE:** Submit the material only to: <https://seer.ufg.br/ActaScientiaeVeterinariae/about/submissions#onlineSubmissions>

Papers are published in order of approval for publication.

Publication FEES (after the article has been accepted)

US\$ 600.00 net

Authors, or their funding institutions, are responsible for the payment of publication fees. Payment must be made in full; please note that banking fees should also be taken into account as of the calculation of the value to be deposited. **If deductions are made, the deposit will be deemed incomplete, and manuscript will NOT be published until net value is deposited. The fee is due based on the publication year.**

TYPES OF PAPERS

REVIEW PAPER: Review articles are requested by the Editorial Board or examined for publication through an author's own initiative. The authors of a review article should be **experts on the subject of the review**, as proved by papers published and by citations of their own published papers in the submitted review.

The authors of a review article have to send a preliminary proposal for the review. This proposal has to contain: Abstract (Background; Review and Discussion), a list of up to six keywords, and a sequential and numbered description of the topics that are to be addressed in the review, which should be prepared based on the maximum limit of 120 references. The standard format available online should be observed.

It is essential that the authors of a review article are cited as authors of at least 10 other articles addressing the same subject as the review article submitted (**five** of which have to have been published in journals with **impact factor 1** or higher, and the **other articles** in journals with **minimum impact factor of 0.5**). In the reference list, authors who have written or co-written an article cited in the review article submitted are required to place **the impact factor of the respective journal in bold, after the number of pages**.

RESEARCH ARTICLE: An Original Article should present a previously unpublished clear hypothesis and data (according to an appropriate experimental design, when such is the case). Writing style should be concise but clear enough to afford to reproduce the experimental methodology as described. The Discussion section should be understandable considering the general context of the subject researched, affording the means to reach conclusions based on the data obtained or observed. An Original Paper should not normally exceed 15 pages in length nor contain over 60 references.

PREPARATION OF MANUSCRIPTS

1. Abstract: The Abstract should be concisely written in the **past tense**, in accordance to the **character limits (3,400 minimum - 3,900 maximum, including spaces)**, emphasizing the importance of the research subject, the objectives of the paper and containing a brief description of the experiment, the results obtained, specific data and the respective statistical meaning (if possible) and the main conclusions. The abstract should condense all sections of the paper. Never start with the objectives of the paper. The abstract should be followed by up to **6** keywords.

2. Introduction: This section should be briefly, clearly and objectively written, containing information that explains the importance of the paper. References cited in the introduction should

address the specific research topic. The introduction should always end with the objective(s) of the paper, and **should not exceed the limit maximum of 1,700 character including spaces**.

Citations of References in the text: As a rule, references are represented by Arabic numerals in square brackets, corresponding to the respective authors arranged and numbered in alphabetical order, with NO spaces between different references. Examples of reference representations in the text are: [2], [7,9,16], [23-27,31,33,45-48]. However, in situations where the mention of authors' names is essential (which happens in just a few cases), please observe the following suggestions: "The first description was made by Author & Author [3]..."; "Author & Author [32] started the ..."; "In 1958, Author *et al.* [18]...". Unpublished data and personal communications should be represented as: (Author, personal communication, year) and (Author & Author, unpublished data). E-mail or mail addresses of authors of personal communications and of unpublished data should be informed before the References section.

3. Materials and Methods: This section should present all information that affords the reproducibility of the experimental procedure. Wellknown methods and techniques should only be mentioned, while new methodologies should be described in detail. Whenever appropriate, chemicals and equipment are to be cited using superscript numbers, whose manufacturers are to be presented in a subsection called "Sources and Manufacturers". When animals are used in the experiments, the ethical conduct recommended by the International Guiding Principles for Biomedical Research Involving Animals should be observed, according to the Council for International Organization of Medical Sciences (executive Secretary C.I.O.M.S., c/o W.H.O., Via Appia, CH, 1211, Geneva 27, Switzerland).

Note on the statistical treatment of data: Whenever possible, authors should quantify and present the results using the appropriate statistical measurements, like confidence intervals, for instance. Authors are required to avoid resorting solely to statistical hypotheses, such as the use of *P* values, since this approach leaves out important quantitative information. The choice of the individuals that became the object of the research should be explained, the method should be detailed. The possible complications related to the treatment should be given. Computer softwares used should be mentioned.

4. Results (separate from the Discussion section): This section should provide clear and concise information only about the *relevant observations* that, depending on the nature of the research paper, should present a statistical analysis. The content should be informative instead of interpretative and, if necessary, tables, figures or other self-explanatory illustrations are to be provided. Legends should contain enough details to afford the full comprehension of figures and tables without having to resort to the text. Complex results should be expressed in graphics instead of tables that contain excessive minor details. The results should be presented in an orderly sequence, and following the sequence of the Methods section upon which the results are based. It is important to carefully plan the tables and figures to ensure that their sequencing is compatible with the text. The text should complement the figures or tables, not repeat the same information.

Observations about Tables x Figures

As you prepare your article, *consider whether a figure or a table is more appropriate*. Readers typically study tables and figures before they read the text. Therefore, each table and figure should stand

alone, complete and informative in itself.

They should be self-explanatory. Both tables and figures are used to support conclusions or illustrate concepts, but they have essential differences in purpose:

-Tables present numbers for comparison with other numbers or summarize or define concepts, terms, or other details of a study. If the text is crowded with especially quantitative detail - information should be presented in tables in order to let the reader compare easily. Do not overload the text with information that could be presented better in a table. *If a table has only a few rows and columns, try stating the findings in a few sentences.* Do not use too many small tables for information that could be presented better in the text. Tables are often used for reporting extensive numerical data in an organized manner.

Guidelines

In order to ensure that your tables will be prepared accurately for typesetting give preference for Microsoft Word table feature: the table that you create should have defined cells. DO NOT: 1- create tables by using the space bar and/or tab keys; 2- separate data horizontally with a new row; 3- insert blank columns or rows. Asterisks or letters next to values indicating statistical significance should appear in the same cell as the value.

-Figures/Graphs reveal trends or delineate selected features. Sometimes the two purposes overlap, but they rarely substitute for one another.

In a difficult prose explanation, decide whether it could be better described with a figure.

Data presented in tables should not be duplicated in graphs, and vice versa.

Tables: Are to be numbered using Arabic numerals. **No table is to be sent embedded in the main text file.** Each table should be presented in a separate file. All tables should be cited in the text in numerical ascending order. An approximate position of each table should be presented on the margin of the respective page. Tables should be self-explanatory and contain a descriptive title (place and date are to be included, when necessary). Details concerning table data should be indicated by letters or symbols, which are to be listed in an orderly manner and explained as a table footnote. With a view to avoiding long tables containing a large number of dispersed data of little importance, authors are required to consider the presentation of only the most important data in tables. Statistical measurements like confidence intervals, standard deviation etc. should be identified.

Figures: Color (CMYK) or gray scale figures have to be sent as digital 300-dpi TIFF files saved on a CD to be sent to ASV, irrespective of digital software. **No image is to be sent embedded in the main text file.** Photographs of microscopy images should contain a scale bar embedded. Symbols, arrows and letters used in photomicrography should be inserted so as to afford clear contrast against the image background, and a scale bar should be provided according to the magnification informed in the figure legend. Digital photographs should be taken using a camera with maximum resolution (minimum 5 megapixels). Images may never be sent as JPG or GIF files.

Measurement units: All measurements should be expressed as IS (International System) units. Temperature is expressed as Celsius degrees, blood pressure as millimeters of mercury. All hemato-

logical and biochemical values should be presented as decimal metric system units, according to the International Measurement System (IS). The Editorial Board may request the authors to use alternative units that do not belong to the IS to express values, before publication.

Abbreviations: Authors should avoid using abbreviations. When these are employed, authors are required to use standard abbreviations which should be defined as of the first citation of the term (the exception are measurement units). Considering Latin species names, the genus portion of the name should be abbreviated after the first citation (except in the beginning of a sentence). Abbreviations should not be used in the title and, if possible, authors are not to use abbreviations in the Abstract.

5. Discussion: The content of the Discussion section should be interpretative. The hypotheses and suppositions formulated based on the data obtained in the paper should be related to the current knowledge on the topic published in other studies. The Discussion should cite only the essential references. Authors are required to discuss the implications of the data obtained and the respective limitations, also mentioning the representativeness of such information in the conduction of future research.

6. Conclusion(s): The conclusions of the paper should be linked to the respective objectives. They should be strictly based on the results obtained in the research and on facts that are fully backed by these results. Authors are specifically required to refrain from commenting on economic benefits and expenses, unless the manuscript includes economic analysis and information.

7. Manufacturers: These notes are used to inform the origin of commercial products by citing manufacturer (complete name of the company), city and country. These notes should be numbered consecutively, *citing manufacturer, city and country*, as superscript numerals and appear after the Conclusion's section (**DO NOT repeat the name of any manufacturer**).

8. Funding. Authors are required to remember that financial support and grants are to be mentioned in this section.

9. Acknowledgements. Should be brief and address the significant technical cooperation and orientation by colleagues in the conduction of the study.

10. Ethical approval. Authors are required to inform an approval statement (process number) by an ethics committee of the institution in which the research was carried.

11. Declaration of interest. Conflict-of-interest may be personal, commercial, political, academic or financial. It is particularly important for authors to provide a full and complete disclosure of any financial relationship with a commercial organisation that may have an interest in the contents of the submitted manuscript..

12. References: Papers submitted to *Acta Scientiae Veterinariae* shall not be reviewed when references are incomplete or not in accordance with the journal's standards. Reference research papers should be numbered in **alphabetical order**, as follows: Number - Surname (the first letter in capitals) followed by initials in capital letters followed by a dot (names of authors should be separated by commas, except the last

author's name, which should be preceded by an ampersand)
- Year of publication - Title of the paper - **Full name of the journal of publication** (in italic type, with no abbreviation)
- volume (issue): pages-pages. DOI:.... Please submit each reference to a thorough inspection to ensure that all of the aforementioned criteria are met.

Examples of references

• Papers

→ WITH TWO AUTHORS:

Selvinaz Y. & Aksoy O. 2018. Comparison of the Effects of Isoflurane and Sevoflurane General Anaesthesia after Induction by Propofol on Clinical and Physiological Measurements in Calves. *Acta Scientiae Veterinariae*. 47: 1659. DOI: 10.22456/1679-9216.92279

→ WITH SEVERAL AUTHORS:

Wang L., Wang C., Jia X., Yang M. & Yu J. 2020. Relationship between Neutrophil-to-Lymphocyte Ratio and Systemic Lupus Erythematosus: a meta-analysis. *Clinics*. 75:e1450. DOI: 10.6061/clinics/2020/e1450.

Note 1: References are numbered in alphabetical order considering the surnames of authors, instead of year of publication. For example:

7 Berlinguer F., Leoni G., Bogliolo L., Pintus P.P., Rosati I., Ledda S. & Naitana S. 2004.

8 Bernardi M.L., Cotinot C., Payen E. & Delouis C. 1996.

9 Bernardi M.L. & Delouis C. 1995.

10 Bernardi M.L. & Delouis C. 1996.

11 Bernardi M.L., Fléchon J-E. & Delouis C. 1996.

26 Martinez E.A., Vazquez J.M., Roca J., Lucas X., Gil M.A., Par-rilla J.L., Vazquez J.L. & Day B.N. 2002.

27 Martinez E.A., Vazquez J.M., Roca J., Lucas X., Gil M.A. & Vazquez J.L. 2001.

28 Martini R. L. 1998.

29 Matthijsa A., Hakze R., Potsma A. & Woelders H. 2000.

30 Matthijsa A., Harkema W., Engel B. & Woelders H. 2000.

68 Tervit H.R., Whittingham D.G. & Rowson L.E.A. 1972.

69 Thompson J.G. 1997.

70 Thompson J.G., Gardner D.K., Pugh P.A., McMillan W.H. & Tervit H.R. 1995.

71 Thompson J.G., Simpson A.C., Pugh P.A., Donnelly P.E. & Tervit H.R. 1990.

72 Thompson J.G., Simpson A.C., Pugh P.A. & Tervit H.R. 1992.

73 Thompson J.G., Simpson A.C., Pugh P.A., Wright R.W. & Tervit H.R. 1991.

Note 2: In the occurrence of references with identical sequence of authors' names, identical year of publication and different journals, these references should be listed according to the order of citation in the manuscript. If these reference papers have been published also by the same journal, consider the chronological order.

→ PUBLISHED IN A VOLUME SUPPLEMENT:

Pier A.C., Cabañes F.J., Chermette R., Ferreiro L., Guillot J., Jensen H.E. & Santurio J.M. 2000. Prominent animal mycoses from various regions of the world. *Medical Mycology*. 38 (Suppl 1): 47-58.

→ PAPER PUBLISHED IN JOURNAL NUMBER WITHOUT INDICATION OF VOLUME

Turan L., Wredmark T. & Fellander-Tsai I. 1995. Arthroscopic ankle arthrodesis in rheumatoid arthritis. *Clinical of Orthopedic*. (320): 110-114.

→ PAPER PUBLISHED IN ELECTRONIC FORMAT:

Morse S.S. 1995. Factors in the emergence of infectious diseases. *Emerging Infectious Diseases*. 1: 7-15. [Fonte: <<http://www.cdc.gov/ncidod/EID/eid.htm>>].

United States Food and Drug Administration. 2003. Center for Food Safety & Applied Nutrition. *Bacteriological Analytical Manual Online. Salmonella*, 13p. Disponível em: <<http://www.cfsan.fda.gov>>. Acessado em 04/2003.

→ PAPER IN PRESS:

Mosena A.C.S., Weber M.N., Cibulski, S.P. Paim, W.P., Silva, G.S., Medeiros, A.A.R., Viana, N.A., Baumbach, L.F., Silveira, S., Corbellini, L.G. & Canal C.W. 2019. Survey for pestiviruses in backyard pig farms in Southern Brazil. *Journal of Veterinary Diagnostic Investigation*. [in press].

→ PAPER PUBLISHED IN EVENT PROCEEDINGS:

[authors are required to always include number of event, city and country]

Paim W.P., Puhl D.E., Weber M.N., Cibulski S.P., Budaszewski R.F. & Canal C.W. 2018. An overview in virome of commercial batches of horse serum. In: XXIX Brazilian Congress of Virology & XIII Mercosur Meeting of Virology (Gramado, Brazil). pp.113-114.

→ PAPER PUBLISHED IN COLLECTION OR SERIES:

Jellieff D.B. 1968. Evaluación del estado de nutrición dela comunidad. Ginebra: Organizacion Mundial de la Salud. [Serie de Monografias, 53], 201p.

• ABSTRACTS

[Authors are required to always include number of event, city and country]

→ PUBLISHED IN ANNALS:

Bisol J.F.W., Vieira M.J., Keller A., Mattos R.C. & Gregory R.M. 2000. Efeito da adição de antibióticos ao diluente de sêmen resfriado equino na fertilidade de éguas. In: *Resumos do XII Salão de Iniciação Científica da UFRGS* (Porto Alegre, Brasil). p.125.

→ PUBLISHED IN ANNALS OF SEVERAL VOLUMES:

Barcellos D.E.S.N., Razia L.E. & Borowski S.M. 2002. Microagglutination test detecting antibodies against *Bra-chyspira pilosicoli* [paper 537]. In: *Proceedings of the 17th Congress of the International Pig Veterinary Society*. v.2. (Ames, U.S.A.). p.362.

→ PUBLISHED IN JOURNALS:

Reischak D., Costa U.M., Moojen V. & Ravazzolo A.P. 1999. Ovine synovial membrane cell line permissive to *in vitro*

caprine lentivirus replication [abstract A-097]. In: *Viroológica* 99 (Curitiba, Brazil). *Virus Reviews & Research*. 4(1): 81-82.

• THESES / DISSERTATIONS

Dorneles A.S. 2014. Aspergilose em frango de corte: diagnóstico, identificação e caracterização da diversidade genética de *Aspergillus fumigatus*. 32f. Porto Alegre, RS. Tese (Doutorado em Ciências Veterinárias) - Programa de Pós-Graduação em Ciências Veterinárias, Universidade Federal do Rio Grande do Sul.

• BOOKS

[Authors are required to inform city and publishing company of the book]

→ CHAPTER IN BOOK WITH AUTHORSHIP:

Ferreiro L., Spanemberg A., Azevedo M.I., Zanette R.A. & Pereira S.A. 2020. Diagnóstico Micológico. In: Larsson C.E. & Lucas R. (Eds). *Tratado de Medicina Externa - Dermatologia Veterinária*. 2.ed. São Caetano do Sul: Interbook Editorial Ltda., pp.19-72. [mencionar o Ed ou Eds]

→ REFERENCE TO A CHAPTER IN AN EDITED BOOK:

Solomon S.E. & Nascimento V.P. 1994. Hen's eggshell structure and function. In: *The Microbiology of the Avian Egg*. London: Chapman & Hall, pp.1-24.

• TECHNICAL REPORTS / BULLETINS

Instituto Brasileiro de Geografia e Estatística (IBGE). 1982. Censo Demográfico: Dados Distritais. Rio de Janeiro. v.1. IBGE, 20p.

World Health Organization. 1994. Expert Committee on Drug Dependence. Geneva. 29th Report . Geneva. (WHO-Technical Report Series, 856).120p.

• OTHER MODALITIES OF REFERENCES

▪ *Letter to the editor: Enzensberger W. & Fischer P.A. 1996.* Metronome in Parkinson's disease. *Lancet*. 347: 1337. [Letter]

▪ *Editorial: Singer M.V., Gyr K. & Sarles H. 1985.* Revised classification of peritonitis. *Gastroenterology*. 89: 683-685. [Editorial]

EXAMPLES OF REFERENCES

JOURNALS

- 1 **Allocati N., Masulli M., Di Ilio C. & Federici L. 2018.** Glutathione transferases: substrates, inhibitors and pro-drugs in cancer and neurodegenerative diseases. *Oncogenesis*. 7(1): 8. DOI: 10.1038/s41389-017-0025-3.
- 2 **Anon J., Singh N.K., Singh H. & Rath S.S. 2021.** Adult bioassay based Amitraz resistance status in *Rhipicephalus microplus* populations of Punjab, India. *Exploratory Animal and Medical Research*. 11(1): 49. DOI: 10.52635/EAMR/11.1.49-54
- 3 **Bain L.J. & LeBlanc G.A. 1996.** Interaction of structurally diverse pesticides with the human MDR1 gene product P-glycoprotein. *Toxicology and Applied Pharmacology*. 141(1): 288-298.
- 4 **Baron S., van der Merwe N.A., Madder M. & Maritz-Olivier C. 2015.** SNP Analysis Infers that Recombination Is Involved in the Evolution of Amitraz Resistance in *Rhipicephalus microplus*. *PLOS ONE*. 10(7): e0131341. DOI: 10.1371/journal.pone.0131341
- 5 **Broehan G., Kroeger T., Lorenzen M. & Merzendorfer H. 2013.** Functional analysis of the ATP-binding cassette (ABC) transporter gene family of *Tribolium castaneum*. *BMC Genomics*. 14(1): 6. DOI: 10.1186/1471-2164-14-6.
- 6 **Castro Janer E., Díaz A., Fontes F., Baraibar F., Saporiti T. & Olhagaray M.E. 2021.** Molecular survey of pyrethroid and fipronil resistance in isolates of *Rhipicephalus microplus* in the north of Uruguay. *Ticks and Tick-Borne Diseases*. 12(5): 101747. DOI: 10.1016/j.ttbdis.2021.101747.
- 7 **Coles T.B. & Dryden M.W. 2014.** Insecticide/acaricide resistance in fleas and ticks infesting dogs and cats. *Parasites & Vectors*. 7(1): 8. DOI: 10.1186/1756-3305-7-8
- 8 **Dantas-Torres F., Fernandes Martins T., Muñoz-Leal S., Onofrio V.C. & Barros-Battesti D.M. 2019.** Ticks (Ixodida: Argasidae, Ixodidae) of Brazil: Updated species checklist and taxonomic keys. *Ticks and Tick-Borne Diseases*. 10(6): 101252. DOI: 10.1016/j.ttbdis.2019.06.012.
- 9 **Denecke S., Fusetto R. & Batterham P. 2017.** Describing the role of *Drosophila melanogaster* ABC transporters in insecticide biology using CRISPR-Cas9 knockouts. *Insect Biochemistry and Molecular Biology*. 91: 1-9. DOI: 10.1016/j.ibmb.2017.09.017
- 10 **Dermauw W., Osborne E., Clark R.M., Grbić M., Tirry L. & Van Leeuwen T. 2013.** A burst of ABC genes in the genome of the polyphagous spider mite *Tetranychus urticae*. *BMC Genomics*. 14(1): 317. DOI: 10.1186/1471-2164-14-317
- 11 **Epis S., Porretta D., Mastrantonio V., Comandatore F., Sasseria D., Rossi P., Cafarchia C., Otranto D., Favia G., Genchi C., Bandi C. & Urbanelli S. 2014.** ABC transporters are involved in defense against permethrin insecticide in the malaria vector *Anopheles stephensi*. *Parasites & Vectors*. 7(1): 349. DOI: 10.1186/1756-3305-7-349
- 12 **Feng X., Li M. & Liu N. 2018.** Carboxylesterase genes in pyrethroid resistant house flies, *Musca domestica*. *Insect Biochemistry and Molecular Biology*. 92: 30-39.
- 13 **Fernández-Salas A., Rodríguez-Vivas R.I. & Alonso-Díaz M.A. 2012.** First report of a *Rhipicephalus microplus* tick population multi-resistant to acaricides and ivermectin in the Mexican tropics. *Veterinary Parasitology*. 183(3-4): 338-342.
- 14 **Hernandez E.P., Kusakisako K., Talactac M.R., Galay R.L., Hatta T., Fujisaki K., Tsuji N. & Tanaka T. 2018.** Glutathione S-transferases play a role in the detoxification of flumethrin and chlorpyrifos in *Haemaphysalis longicornis*. *Parasites & Vectors*. 11(1): 460. DOI: 10.1186/s13071-018-3044-9
- 15 **Jongejan F. & Uilenberg G. 2004.** The global importance

- of ticks. *Parasitology*. 129(Suppl): S3-S14. DOI: 10.1017/s0031182004005967
- 16 **Jonsson N.N. 2006.** The productivity effects of cattle tick (*Boophilus microplus*) infestation on cattle, with particular reference to *Bos indicus* cattle and their crosses. *Veterinary Parasitology*. 137(1-2): 1-10.
- 17 **Jonsson N.N. 2018.** Molecular biology of amitraz resistance in cattle ticks of the genus *Rhipicephalus*. *Frontiers in Bioscience*. 23(2): 796-810.
- 18 **Klafke G.M., Miller R.J., Tidwell J., Barreto R., Guerrero F.D., Kaufman P.E. & Pérez de León A.A. 2017.** Mutation in the Sodium Channel Gene Corresponds With Phenotypic Resistance of *Rhipicephalus sanguineus sensu lato* (Acari: Ixodidae) to Pyrethroids. *Journal of Medical Entomology*. 54(6): 1639-1642.
- 19 **Kumar R., Klafke G.M. & Miller R.J. 2020.** Voltage-gated sodium channel gene mutations and pyrethroid resistance in *Rhipicephalus microplus*. *Ticks and Tick-Borne Diseases*. 11(3): 101404. DOI: 10.1016/j.ttbdis.2020.101404
- 20 **Le Gall V.L., Klafke G.M. & Torres T.T. 2018.** Detoxification mechanisms involved in ivermectin resistance in the cattle tick, *Rhipicephalus (Boophilus) microplus*. *Scientific Reports*. 8(1): 12401. DOI: 10.1038/s41598-018-30907-7
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